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Examining the impacts of the COVID-19 pandemic on family mental health in Canada: Findings from a national cross-sectional study

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Abstract

Objectives: To describe the mental health impacts of the COVID-19 pandemic on families with children in Canada.

Design, setting, participants: This descriptive study utilized a nationally representative, cross-sectional survey of adults living in Canada (N=3000) to examine the mental health impacts of the COVID-19 pandemic. Outcomes among parents with children <18 years old living at home (n=618) were compared to the rest of the sample. Data were collected via online survey between May 14-29, 2020.

Outcome measures: Participants reported on changes to their mental health since the onset of the pandemic and sources of stress, emotional responses, substance use patterns, and suicidality/self-harm. Additionally, parents identified changes in their interactions with their children, impacts on their children's mental health, and sources of support accessed.

Results: 44.3% of parents with children <18 years living at home reported worse mental health as result of COVID-19 compared to 35.6% of respondents without children <18 living at home, χ^2 (1, *N*=3000) = 16.2, *p*<.001. More parents compared to the rest of the sample reported increased alcohol consumption (27.7% vs 16.1%, χ^2 (1, *N*=3000) = 43.8, *p*<.001), suicidal thoughts/feelings (8.3% vs 5.2%, χ^2 (1, *N*=3000) = 8.0, *p*=.005), and stress about being safe from physical/emotional domestic violence (11.5% vs 7.9%, χ^2 (1, *N*=3000) = 8.1, *p*=.005). 24.8% (95% CI 21.4-28.4) of parents reported their children's mental health had worsened since the pandemic and 22.2% (95% CI 19.0-25.7) reported more conflicts with their children. Negative parent-child interactions were more frequent among parents reporting financial and pre-existing mental health concerns.

Conclusions: This study identifies that families have experienced deteriorated mental health due to the pandemic. Population-level responses are required to adequately respond to families' diverse needs and mitigate the potential for widening health and social inequities for parents and children.

Article Summary

Strengths and limitations of the study

- Survey items were informed by a longitudinal COVID-19 mental health survey, first commissioned by the UK Mental Health Foundation and developed in consultation with people with lived experience of mental health conditions; Adaptations were made for the Canadian context and to support analyses focused on issues of equity.
- The large sample size enabled subgroup analyses in mental health according to gender, age, pre-existing mental health conditions, disabilities, and household demographics.
- Targeted sampling ensured participation from families of diverse backgrounds.
- Cross-sectional observational design and lack of adjustment for potential confounding prohibits causal inference.

Keywords: Mental health, Public health, Community child health, Epidemiology, COVID-19

Introduction

The COVID-19 pandemic has led to unprecedented global morbidity and mortality, with population mental health impacts recognized as a growing concern and particular risks identified within the family context (1). Specifically, the COVID-19 pandemic has posed new threats to families through social isolation, school closures, financial and employment insecurity, housing instability, and changes to health and social care access (2). These shifts have profoundly interrupted the systems and structures that previously supported the mental health and wellbeing of families, and also operated to mitigate the risks that contribute to health and social inequities.

During the pandemic, many parents have experienced increased pressures and erosions to social supports, with implications for their mental health. In a US survey, the majority of parents expressed that concerns about finances, social isolation, criticism from others, as well as emotional experiences of sadness and loneliness were affecting their parenting (3). Globally, school and childcare closures and the hiatus of after-school activities has added to parental pressure to balance responsibilities, including becoming the sole providers of supervision and education for their children – all while experiencing heightened financial and emotional stress (4). Importantly, while all families are affected by the disruptions of the pandemic, these pressures disproportionately affect families who experience health and social inequities including fewer financial and social resources, crowded homes, and limited technology and internet access (4,5). Emerging studies show that the collision of these stressors contribute to increases in domestic violence (6), and have increased incidents of shouting and physical punishment of children since the pandemic began (3).

In Canada, there are early indications that the pandemic is impacting the mental health and wellbeing of children.[1] There has been a dramatic surge in calls documented by Kids Help Phone, a national helpline for young people, with a 48% increase in calls about social isolation, a 42% increase in calls about anxiety and stress, and a 28% increase in calls about physical abuse (7). Experts have raised alarms that disruptions to routines and services, combined with increased family stressors, social isolation, and domestic violence are creating conditions that risk increasing child mental health problems on an unprecedented scale, with children from marginalized and socioeconomically disadvantaged backgrounds likely to be disproportionately affected (8). Thus, while young people appear to be less susceptible to the physical effects of the virus, they are experiencing significant challenges, likely resulting from the social and economic impacts of the pandemic within their family contexts. This is particularly concerning as research consistently demonstrates that children's early exposures to stress can have lasting effects (9–12).

Families and children are furthermore supported by a social ecological system that has been forced to adapt quickly to support families' needs, with limited information or evaluation. School and childcare closures due to the pandemic are concerning not only for the disruption to typical classroom learning, but also for the loss of systems-level safeguards such as nutrition programs, after-school care, school health and counseling services, and vaccination clinics (13) that seek to mitigate some consequences of health and social inequities among structurally vulnerable children and families. And yet, even as schools and workplaces start to re-open, the health risks of returning to populated spaces (including public transit) will disproportionally affect families with lower incomes, fewer resources, and with limited options for returning to work (14). Furthermore, families, childcare settings, and schools are nested within health authorities and government structures that determine many of the policies,

[1] For the context of this study, children are defined as children and youth below the age of 18.

services, and financial and employment supports available to parents as well as the availability of these supports beyond the pandemic.

To contribute further understandings of the impact of the COVID-19 pandemic on families, this paper presents findings from the first wave of a nationally representative cross-sectional survey monitoring the mental health of people living in Canada. The questions informing this paper include: a) How is the COVID-19 pandemic affecting the mental health of parents and children and what populations or groups are most impacted by the pandemic? b) How have parent-child interactions changed due to the pandemic? and c) What are the factors that support mental health in the family context? The findings provide critical evidence to inform rapid, data-driven public health responses to meet the mental health needs of families and children in the context of the COVID-19 pandemic and beyond.

Methods

Survey development and approach

This investigation focuses on data from the initial wave of our cross-sectional survey, *"Assessing the Impacts of COVID-19 on Mental Health."* The study represents a unique collaboration between academic researchers from the University of British Columbia, the Canadian Mental Health Association (Canada), and by an international research partnership with the Mental Health Foundation (UK).

Patient and public involvement

Survey items were informed by a longitudinal survey first commissioned by the Mental Health Foundation in March 2020 and developed in consultation with people with lived experience of mental health conditions via a citizen's jury participatory methodology process (15). Adaptations were made to reflect the Canadian context, aimed at examining indicators of mental health, stress, and coping related to the COVID-19 pandemic among the Canadian population. Modifications included adding items on the impacts on young people's mental health, their potential sources of support, family dynamics, financial interventions introduced by the Government of Canada in response to the pandemic (e.g., Canada Emergency Response Benefit), and food security systems. Survey items are provided in Additional File 1.

Procedure

Data were collected between May 14-29, 2020, via a rapid online survey distributed by polling vendor Maru/Matchbox. Participants (n=3000) were randomly selected members of the Maru Voice Canada panel, consisting of approximately 125,000 Canadian adults. Surveys were distributed to 3558 panel members to reach a total of 3000 respondents, yielding an invitation-to-response rate of 84%. Panel participants were recruited through direct email, with targeted sampling through affiliate community partners to increase inclusion of populations that may be difficult to reach via the internet (e.g., older adults, people of ethnic minority) (16). Population representativeness was achieved through use of a balancing matrix, involving a combination quota sampling and response propensity statistics (16). The data collection period captured the first phases of "re-opening" across many Canadian provinces and territories, emerging from approximately two months of mandated physical distancing, school and work closures, and related disruptions.

All participants completed an online consent process prior to beginning the survey and were provided with a small honorarium through Maru/Matchbox to compensate for their time. Ethics approval was provided by the Behavioural Research Ethics Board at the University of British Columbia (H20-01273).

Measures and Analyses

This investigation focuses on a subsample of participants who identified as parents with children <18 currently living at home (n=618). Changes in mental health due to the pandemic were compared between this parent subsample and the rest of the sample (i.e., respondents who were not parents with children <18 living at home). Comparisons were also conducted within the subsample of parents. Participants completed sociodemographic questions as well as survey questions about their mental health, emotional responses to the pandemic, changes in substance use, experiences of suicidal thoughts, and self-harm. Parents also completed questions on changes to parent-child interactions, impacts of the pandemic on their children's mental health, and were asked to identify sources of stress and support for themselves and their children.

Descriptive and bivariate analyses (frequencies, chi square tests) were used to examine self-reported changes in mental health since the onset of the pandemic across groups defined by gender, age, disability, and pre-existing mental health conditions, as well as frequently identified stressors, supports, and changes in parent-child interactions. The maximum margin of error for proportions derived from the parent subsample was +/- 3.9% at a 95% level of confidence. This was a complete case analysis. In chi squared analyses, "don't know," "not applicable," and "prefer not to answer" responses were treated as "not yes."

Results

Sample description

Of the 3000 respondents, 618 identified as parents to a child <18 living at home.[2] The parent subsample consisted of 52% women and the average age was 43.0 years (SD=9.0 years). Further sample characteristics are presented in Table 1.

- Insert Table 1 -

Pandemic-related changes in parent mental health

Parents identified more risks and vulnerabilities compared to respondents without children <18 years living at home across a number of mental health constructs. Since the onset of COVID-19, a significantly higher proportion of parents reported deteriorated mental health (44.3%) compared to 35.6% among their counterparts without children <18 years at home, χ^2 (1, N = 3000) = 16.2, p < .001. Changes to mental health furthermore varied across sociodemographic characteristics within the parent subsample (Table 2). Among parents with children at home, deteriorated mental health was significantly more prevalent among women, parents under age 35, parents of younger children (≤ 4 years), parents with a pre-existing mental health condition, parents with a disability, and parents reporting financial stress. When asked about their emotions in the past two weeks as a result of COVID-19, the most frequent

[2] In the following when we refer to parents, these are parents living with children <18 unless otherwise specified.

response from parents was anxious and worried (51.9%; 95% CI 47.9-55.9), followed by stressed (46.1%; 95% CI 42.1-50.1), and bored (39.5%; 95% CI 35.6-43.5).

- Insert Table 2 -

Overall, 8.3% of parents reported experiencing suicidal thoughts/feelings as a result of the COVID-19 pandemic in the past two weeks compared to 5.2% among their counterparts, χ^2 (1, N = 3000) = 8.0, p = .005. Furthermore, 2.6% of parents reported deliberately hurting themselves as a result of the pandemic in the past two weeks compared to 1.3% among their counterparts, χ^2 (1, N = 3000) = 4.8, p = .028.

As a means of coping with deteriorations in mental health and stressors of the pandemic, many parents identified an increase in alcohol use. Specifically, 27.7% of parents reported increased alcohol consumption compared to 16.1% among those without children at home, χ^2 (1, N = 3000) = 43.8, p < .001. Among the parent subsample, increased alcohol consumption was more prevalent among men (32.3%) compared to women (23.5%), χ^2 (1, N = 618) = 6.0, p = .014.

Pandemic-related stressors

When asked about stressors and worries resulting from the COVID-19 pandemic in the past two weeks, parents most frequently reported mental health impacts, physical health threats related to the pandemic, and relational and financial concerns (Figure 1). Being able to cope with uncertainty (59.2%; 95% CI 55.2-63.1), fear of a family member getting sick or dying (58.9%; 95% CI 54.9-62.8), and being separated from friends and family (58.7%; 95% CI 54.7-62.7) were the most frequent responses. A large proportion also reported being stressed about financial concerns (45.6%; 95% CI 41.2-49.7), losing/loss of job (31.4%; 95% CI 27.8-35.2), and having enough food to meet their household's basic needs (20.4%; 95% CI 17.3-23.8). 36.9% (95% CI 33.1-40.8) of parents reported being stressed about looking after children while continuing to work and 27.8% (95% CI 24.3-31.6) were stressed that the pandemic would make their existing mental health problems worse.

Relationship challenges were also a prominent concern among parents. For example, 28.3% (95% CI 24.8-32.1) of parents reported being stressed about experiencing relationship challenges with their partner and 11.5% (95% CI 9.1-14.3) reported being stressed about being safe from physical or emotional domestic violence during the two weeks prior. This proportion identifying concern about being safe from domestic violence was significantly higher among parents compared to the rest of the sample (7.9%), χ^2 (1, N = 3000) = 8.1, p =.005. Among the parent subsample, men (14.6%) were more likely to report being stressed about being safe from physical or emotional domestic violence than women (8.6%), χ^2 (1, N = 618) = 5.4, p =.020.

- Insert Figure 1-

Child mental health and parent-child interactions

The majority of parents (59.7%; 95% CI 55.7-63.6) reported their children's mental health had stayed the same since the onset of the COVID-19 pandemic; however, 24.8% (95% CI 21.4-28.4) indicated that their child or children's mental health had worsened.

Overall, due to COVID-19, parents reported more negative interactions with their children, including more conflicts (22.2%; 95% CI 19.0-25.7), yelling/shouting (16.7%; 95% CI 13.8-19.8), disciplining (16.0%; 95% CI 13.2-19.2), and using harsh words (10.7%; 95% CI 8.4-13.4).

Changes in parent-child interactions also varied according to salient sources of stress (i.e., financial concerns and the pandemic causing existing mental health problems to become worse). A higher proportion of parents reported increased harsh words with children when they were stressed about finances (13.8%) compared to parents who did not report this stressor (8.0%), χ^2 (1, N = 618) = 5.4, p = .020. Parents who were stressed that the pandemic would make an existing mental health problem worse, compared to parents without this stressor, also more frequently reported increased harsh words with children since the pandemic (20.9% vs 6.7%), as well as increased discipline (23.8% vs 13.0%), conflicts (33.1% vs 17.9%), and yelling/shouting (31.4% vs 11.0%), χ^2 (1, N = 618) = 10.8-37.2, p's $\leq$ .001.

However, overall parents also reported that there were circumstances in which they experienced increased positive interactions, including having more quality time (65.4%; 95% CI 61.5-69.1), feeling closeness (49.7%; 95% CI 45.7-53.7), showing love or affection to their children (44.5%; 95% CI 40.5-48.5), and observing increased resilience (strength and perseverance) in their children (38.2%; 95% CI 34.3-42.2).

Sources of support

Parents most frequently identified going for a walk/exercise (59.1%; 95% CI 55.1-63.0), connecting with family and friends (50.5%; 95% CI 46.5-54.5), and maintaining a healthy lifestyle (37.9%; 95% CI 34.0-41.8) as strategies that had helped them cope with stress related to the COVID-19 pandemic in the past two weeks. Parents most frequently identified these same strategies, as well as maintaining family routines (53.9%; 95% CI 49.9-57.9), as having helped their children cope with stress related to the pandemic (Figure 2).

Specific to children's stress, 34.0% (95% CI 30.3-37.9) of parents identified staying in touch with teachers, school adults, and child care workers as a source of support during the pandemic, and 5.8% (95% CI 4.1-8.0) identified accessing virtual educational or self-help mental health resources (e.g., websites, apps) as a strategy that had helped their children. Additionally, 4.2% (95% CI 2.8-6.1) of parents had connected their child with a school or community-based mental health worker or counsellor virtually (e.g., via phone or video-chat).

Regarding structural supports, a significantly higher proportion of parents (23.3%) identified having a supportive employer as a factor that helped their stress related to the pandemic in the past two weeks, compared to respondents without children at home (14.1%), χ^2 (1, N = 3000) = 30.9, p < .001. Although overall access of structural supports was low, a significantly higher proportion of parents reported accessing federal financial benefits to help cope with stress in the past two weeks (13.6%) compared to the rest of the sample (9.2%), χ^2 (1, N = 3000) = 10.2, p = .001. When restricted to parents stressed about financial concerns due to COVID-19 (n=282), this proportion increased to 19.1% (95% CI 14.7-24.2). Finally, a significantly higher proportion of parents (7.9%) reported that they or a member of their household had accessed a food-based community program since the onset of the pandemic such as the Food Bank, free meal programs, community kitchens, or food vouchers from a charity, compared to the rest of the sample (4.4%), χ^2 (1, N = 3000) = 12.5, p < .001. When restricted to parents stressed about

having enough food to meet household needs due to COVID-19 (n=126), this proportion increased to 17.5% (95% CI 11.3-25.2).

- Insert Figure 2 -

Discussion

In response to the COVID-19 pandemic, policymakers and service providers globally must make rapid decisions that will have immediate and long-term effects on the mental health and well-being of families and children. To our knowledge, this is the first national Canadian study to identify that parents of children <18 living at home have been disproportionately affected by the COVID-19 pandemic, with 44% reporting worse mental health as a result of the pandemic. Compared to the rest of the population, a larger proportion of parents with children <18 living at home reported increased alcohol consumption as a result of the pandemic, and suicidal thoughts or feelings, self-harm, and stress about being safe from physical or emotional domestic violence in the past two weeks. These data validate early public health concerns regarding the likely increase in alcohol consumption, suicide and self-harm, and domestic violence associated with the pandemic (1,17). Among the parent subsample, women, younger parents, parents of small children, those living with a disability and those with pre-existing mental health conditions reported worse mental health since the start of the pandemic compared to other parents.

Among the parent subsample, more men with children living at home reported increased alcohol use and being stressed about domestic violence compared to women. This gender difference in alcohol use aligns with pre-pandemic research finding that men generally consume more alcohol than women and are more likely than women to externalize distress through increased alcohol consumption (18,19). However, the finding that men reported greater worry and stress from domestic violence than women is contrary to pre-pandemic studies showing that women are disproportionately affected by domestic violence (20,21). Our survey question specifically asked about stress/worries about being safe from physical or emotional domestic violence as a result of the COVID-19 pandemic, which may not be comparable with previous studies. This necessitates further research to unpack this association in the context of social isolation, financial stress, and parenting responsibilities.

Parents with children <18 at home reported unique pressures, including worrying about their children's health, mental health, education, and being stressed about looking after children while continuing to work. A high proportion of parents reported being stressed about financial concerns (46%), about the pandemic making their existing mental health problems worse (28%), and about having enough food to meet their household's basic needs (20%). A larger proportion of parents indicating stress about financial concerns or worsening of existing mental health problems due to the pandemic reported negative interactions with their children, including increased conflicts, discipline, use of harsh words, and yelling/shouting compared to parents without these stressors. These findings emphasize what other research has shown, that children have been largely overlooked as a population vulnerable to the impacts of COVID-19, but are among the most vulnerable to toxic conditions exacerbated by the pandemic including financial stress, food insecurity, domestic violence, and disrupted systems of care and education (22,23).

However, the majority of parents also reported increased positive interactions at home, including having more quality time together, feeling closeness, showing love and affection, and observing resilience in

their children. This is consistent with other studies that have found that while parenting pressures during the pandemic have increased, so have opportunities to strengthen family connectedness (4). Increased time and flexibility at home has created conditions for families to engage in more conversations and activities together (24). Free digital technologies have furthermore facilitated connecting with others outside the home, as well as tools for managing parenting stress and enabling children to participate in school and child-friendly activities online (4,5). That said, digital technologies and online learning are not easily accessible for everyone, particularly for families with limited internet or digital device access and language barriers, and for children with learning difficulties and special needs. In the current study, fewer than 6% of families reported accessing virtual mental health supports as strategies for addressing children's stress related to the pandemic.

Considering the needs of diverse families, as well as issues of health equity, early examinations of the COVID-19 pandemic have emphasized the importance of community organizations and governments in providing access to economic and social supports (25,26). In the current study, a significantly greater proportion of parents with children < 18 living at home compared to the rest of the sample had relied on supportive employers and government financial supports in the past two weeks, and to have accessed food programs since the start of the pandemic. Parents also frequently identified school, community, and government supports that had helped them and their children cope with stress related to COVID-19 pandemic. Other studies have also identified supports such as paid emergency leave, unemployment insurance, rent protection, and access to safe and secure housing and outdoor spaces as critical in supporting parents to have the time and resources necessary to care for their children (25,26). Although these policies and relief systems may not have been designed specifically for families and children, they hold the potential to address the underlying causes (27) of compromised parent and child mental health at the population level, including family financial stress, employment and food insecurity, stigma, overcrowding, and violence. The effectiveness of these policies, however, will depend on the human resources to organize, distribute, and implement services when workforces are already overloaded. For example, in the current study, fewer than one in five families with financial stress or concerns about having enough food to meet their household basic needs had recently accessed federal benefits or food programs, respectively, warranting further investigation into the ease of access to these services (28). Furthermore, many of these underlying causes of health inequities will remain after the COVID-19 crisis has subsided (29), suggesting that many of these interventions should be sustained well beyond the pandemic.

Strengths and Limitations

A notable strength of this study was the large, nationally representative sample that enabled population sub-group analyses to examine disparities in mental health. The study was designed to include participation from families of diverse backgrounds, though small numbers of parents identifying as Indigenous or LGBT2Q+ prohibited us from examining other social inequities of interest. We also did not have a reliable measure of single parent status to investigate mental health trends among this group. The study design was cross-sectional, therefore we cannot determine if outcomes such as parent-child interactions and parent stressors were causally related, only that they were associated. We did not control for potential confounding variables that would further clarify these associations. Finally, this study did not include clinical assessments of mental illness or take into account baseline measures of mental health or multiple comorbidities. The purpose of this study was to assess preliminary impacts of the COVID-19 pandemic on families' mental health at a community level and to provide early data to

inform relevant policy and programming actions. Examining specific impacts on the prevalence of mental health disorders and effective clinical responses is an important focus for future research.

Implications

The COVID-19 pandemic has profoundly impacted the lives of people globally. In the early days of the first "re-opening" phase in Canada, nearly two of every five people reported worse mental health since the pandemic began, with this proportion increasing to nearly one in every two people for parents with children <18 living at home. Schools, communities, and government systems play an essential role in protecting and supporting parents and children, particularly for families without reliable access to the internet or virtual technologies. While pressure is put on parents, it is important to remember that families exist within a social ecosystem with opportunities to promote child and youth mental health. The effectiveness of these systems further depends on intersectoral communication, collaboration, and action, and therefore seeking feedback and advice from community stakeholders will be critical for monitoring whether these systems are working for families and children.

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Author statement (contributions)
AMG, KCT, MG, EJ, and CM co-led the conceptualization of this investigation. AMG directed the data analyses, interpretation and writing of this manuscript. KCT conducted the data analyses and contributed to data interpretation and writing of this manuscript. EJ, CGR, MG, CM, and SH contributed to the interpretation and writing of this manuscript.

Data statement
Data available upon reasonable request.

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Table 1. Sociodemographic characteristics of the parent subsample

		Sample distribution	
		n	%
PARENT DEMOGRAPHICS			
Gender			
	Men	294	47.6%
	Women	324	52.4%
Age			
	18-34	130	21.0%
	35-44	214	34.6%
	45-54	235	38.0%
	55+	39	6.3%
Province of residence			
	Alberta	86	13.9%
	British Columbia/Territories	81	13.1%
	Manitoba/Saskatchewan	49	7.9%
	Ontario	243	39.3%
	Atlantic Provinces	43	7.0%
	Quebec	116	18.8%
Rural vs urban			
	Urban	531	85.9%
	Rural	87	14.1%
Education			
	High school or less	62	10.0%
	Some college/university	226	36.6%
	University+	330	53.4%
Marital status			
	Single, never married	39	6.3%
	Married or partnered	517	83.7%
	Separated, divorced, widowed	62	10.0%
Household Income			
	<$50K	108	17.5%
	$50K to <$100K	197	31.9%

	$100K+	313	50.6%
Employment status			
	Unemployed (due to COVID-19)	86	13.9%
	Unemployed (prior to COVID-19)	21	3.4%
Lesbian, Gay, Bisexual, Transgender, Two-Spirit, and Queer or Questioning			
	Yes	24	3.9%
Pre-existing mental health condition			
	Yes	111	18.0%
Disability			
	Yes	45	7.3%
Ethnicity			
	Indigenous origins (e.g., First Nations, Inuit, Métis)	17	2.8%
	Visible minority (e.g., Asian, Latin American, Middle Eastern, African)	122	19.7%
	European origins (e.g., British, German, Russian)	394	63.8%
Household Living			
	Living with a spouse or partner	500	80.9%
	Living with other adult family members (e.g., parents, grandparents)	26	4.2%
	Living with grandchildren	11	1.8%
CHILD DEMOGRAPHICS			
Child age (check all that apply)			
	4 years and under	183	29.6%
	5-11 years	292	47.2%
	12-17 years	309	50.0%
	18 years and over	70	11.3%
Child siblings at home			
	Yes	325	52.6%

Table 2. Changes in parent self-reported mental health since the onset of the COVID-19 pandemic

		GENDER		AGE		PRE-EXISTING MENTAL HEALTH CONDITION		DISABILITY		UNEMPLOYED DUE TO COVID-19		PARENT TO A CHILD <4 YEARS OLD		PARENT TO A CHILD 5-11 YEARS OLD		PARENT TO A CHILD 12-17 YEARS OLD		PARENT WITH MULTIPLE CHILDREN AT HOME		FINANCIAL CONCERNS	
	Total (n=618)	Female (n=324)	Male (n=294)	<35 yrs (n=130)	35+ yrs (n=488)	Yes (n=111)	Not yes (n=507)	Yes (n=45)	Not yes (n=573)	Yes (n=86)	No (n=532)	Yes (n=183)	No (n=435)	Yes (n=292)	No (n=326)	Yes (n=309)	No (n=309)	Yes (n=325)	No (n=293)	Yes (n=282)	Not Yes (n=336)
Worse Mental Health	274 44.3%	158 48.8%*	116 39.5%	70 53.8%*	204 41.8%	74 66.7%**	200 39.4%	27 60.0%*	247 43.1%	44 51.2%	230 43.2%	101 55.2%**	173 39.8%	124 42.5%	150 46.0%	121 39.2%*	153 49.5%	138 42.5%	136 46.4%	147 52.1%**	127 37.8%

*p<.05, **p<.001

Worse mental health combines slightly and significantly worse mental health. Differences in proportions within groups were tested with Chi-squared tests.
Due to small sample sizes, Indigenous origins and sexuality (Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning) are not reported.

Figure Captions

Figure 1. Parent stressors in the past two weeks as a result of COVID-19

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

Figure 2. Parent-identified supports for addressing children's stress related to COVID-19 in the past two weeks

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

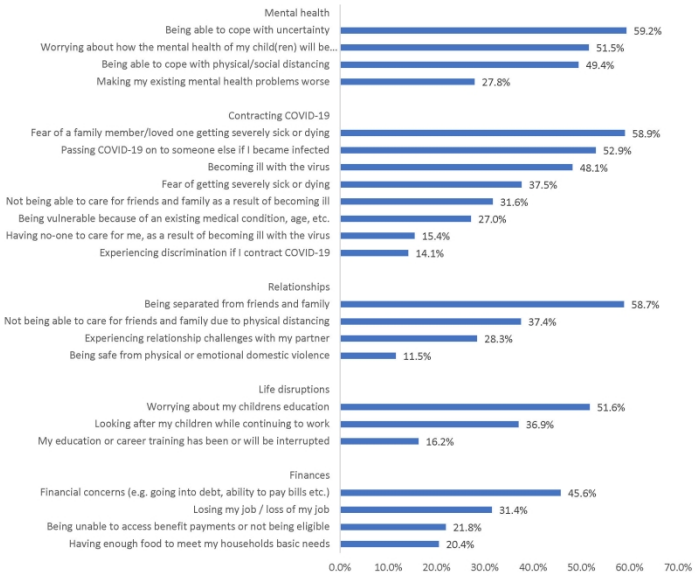

Figure 1. Parent stressors in the past two weeks as a result of COVID-19. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

279x215mm (300 x 300 DPI)

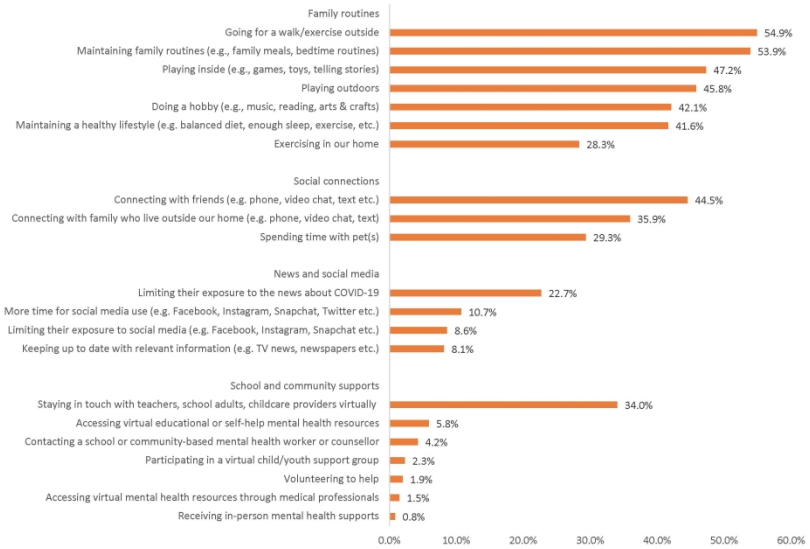

Figure 2. Parent-identified supports for addressing children's stress related to COVID-19 in the past two weeks. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

279x215mm (300 x 300 DPI)

Assessing the mental health impacts of COVID-19: A national survey study

The 2019 novel coronavirus (2019-nCoV), otherwise known as COVID-19, is an infectious disease that has resulted in a global pandemic. Throughout this questionnaire, we will refer to the disease as COVID-19.

For the following questions, we would like you to think about yourself, members of your household, or other family members who have been affected by the COVID-19 virus or response.

We have provided you with a "Prefer not to answer" option, which you can select if you do not wish to share your experiences on a particular question.

Employment Status Which of the following describes your current employment status since the outbreak of COVID-19? (Please select all that apply)

1. Working full time (30 or more hours per week)
2. Working part time (fewer than 30 hours per week)
3. Full time student (e.g. school, college, university, job training)
4. Part time student (e.g. school, college, university, job training)
5. Not working (e.g. parental leave, disability, medical leave, etc.)
6. Volunteer (unpaid)
7. Retired
8. Unemployed
9. Other
10. Prefer not to answer

[If currently working] Essential Service Workers The job that I am currently working in has been deemed as an essential service during the COVID-19 pandemic

1. Yes
2. No
3. Prefer not to answer

[If yes to essential service worker] please select the category that **BEST** describes your essential service role:

1. Health and health services
2. Law enforcement, public safety, first responder
3. Vulnerable population service provider (e.g., community outreach, childcare for essential service workers, substance use and addiction services)
4. Food and agriculture service provider (farming, food processing, grocery, hardware)
5. Transportation
6. Industry and manufacturing
7. Communications and information technology
8. Financial institutions
9. Other
10. Prefer not to answer

Mental Health Compared to before the COVID-19 pandemic and related restrictions in Canada, how would you say your mental health is **now**?

1. Significantly better now
2. Slightly better now
3. About the same
4. Slightly worse now
5. Significantly worse now
6. Prefer not to answer

COVID-19 Disease Which of the following applies to how you have been affected by COVID-19 at any point during the pandemic? (Please select all that apply)

1. I have been tested for COVID-19 and had a positive result
2. I have been tested for COVID-19 and had a negative result
3. Someone in my household has tested positive for COVID-19
4. Someone in my household has tested negative for COVID-19
5. A family member/loved one living at a different address has tested positive for COVID-19
6. I have self-isolated with symptoms of COVID-19
7. My household has self-isolated because someone else had symptoms of COVID-19
8. My household has self-isolated due to contact with someone else who had symptoms of COVID-19
9. My household has self-isolated due to recent travel
10. A family member/loved one living at a different address has self-isolated with symptoms of COVID-19
11. As part of my work I have worked directly with individuals who have tested positive for COVID-19
12. I have been hospitalized due to COVID-19
13. Someone in my household has been hospitalized due to COVID-19
14. A family member/loved one living at a different address has been hospitalized due to COVID-19
15. A family member/loved one is living at a long-term care facility that had cases of COVID-19
16. Someone in my household has died due to COVID-19
17. A family member/loved one living at a different address has died due to COVID-19
18. None of these
19. Don’t know
20. Prefer not to answer

Emotional Response Which of the following emotions have you felt as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Afraid
2. Panicked
3. Anxious or worried
4. Empathetic
5. Indifferent
6. Hopeful
7. Hopeless
8. Ashamed
9. Guilty
10. Lonely
11. Unprepared
12. Fearful
13. Sad
14. Grieving
15. Isolated
16. Angry
17. Stressed
18. Irritable
19. Bored
20. Inspired
21. Depressed
22. Uncertain
23. None of these
24. Don't know
25. Prefer not to answer

Stressors Have you been stressed or worried about any of the following as a result of the COVID-19 pandemic **in the past 2 weeks**? (Please select one option on each row)

1. Financial concerns (e.g. going into debt, ability to pay bills, long-term economic impacts, etc.)
2. Being unable to access benefit payments or not being eligible
3. Losing my job / loss of my job
4. Being able to cope with uncertainty (e.g. not knowing what will happen)
5. Becoming ill with the virus
6. Having no-one to care for me, as a result of becoming ill with the virus
7. Not being able to care for friends and family as a result of becoming ill
8. Not being able to care for friends and family due to physical distancing
9. Passing COVID-19 on to someone else if I became infected
10. Experiencing discrimination if I contract COVID-19
11. Being vulnerable because of an existing medical condition, age, etc.

12. Being separated from friends and family
13. Being able to cope with physical/social distancing (including concerns when needing to leave my residence for groceries, exercise, health care, etc.)
14. Having enough food to meet my household's basic needs
15. My education or career training has been or will be interrupted
16. Looking after my children while continuing to work
17. Making my existing mental health problems worse
18. Worrying about how the mental health of my child(ren) will be affected by the pandemic
19. Worrying about my children's education
20. Experiencing relationship challenges with my partner
21. Being safe from physical or emotional domestic violence
22. Fear of getting severely sick or dying
23. Fear of a family member/loved one getting severely sick or dying

1. Yes
2. No
3. Don't know
4. Not applicable
5. Prefer not to say

Food Security Since the onset of the COVID-19 pandemic and related restrictions in Canada, have you or any members of your household accessed food-based community programs to get food? (please select all that apply)

1. Food Bank
2. Soup Kitchens/Free Meal programs
3. Meal or food programs from a school
4. Community Kitchen program
5. Community Garden
6. Food voucher program (e.g., receiving gift cards for food from a charitable organization)
7. Food delivered by a community program
8. Other
9. No – I haven't accessed any food programs

Stress Overall, how well do you think you are coping with stress related to COVID-19 pandemic?

1. Very well
2. Fairly well
3. Not very well
4. Not well at all
5. Don't know
6. Prefer not to say
7. Not applicable – I have not experienced any stress related to COVID-19

Coping Which of the following have helped you to cope with stress related to the COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Connecting with those in my household
2. Connecting with my family or friends (e.g. phone, video chat, etc.)
3. Connecting with a mental health worker or counsellor **virtually** (e.g. via phone, video chat, etc.)
4. Having a supportive employer
5. Spending time with my pet(s)
6. Receiving **in-person** mental health supports
7. Accessing virtual mental health resources (e.g. online cognitive behavioural therapy, etc.)
8. Maintaining a healthy lifestyle (e.g. balanced diet, enough sleep, exercise, etc.)
9. Keeping up to date with relevant information (e.g. TV news, newspapers, online information, etc.)
10. Limiting my exposure to the news about COVID-19
11. Limiting exposure to social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
12. Increasing my use of social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
13. Contacting a support group (i.e., where members with the same issues can come together for sharing coping strategies, to feel more empowered and/or for a sense of community)
14. Going for a walk/exercise outside
15. Exercising in my home
16. Doing a hobby
17. Learning or doing something new
18. Volunteering to help
19. Accessing federal government benefits and supports (e.g., Canada Emergency Response Benefit, Canada Emergency Wage Subsidy, Canada Emergency Student Benefit, etc.)
20. Accessing provincial government supports (e.g., emergency benefits for workers)
21. Other [open] please specify _____
22. Don't know
23. Nothing has helped me to cope with my stress related to COVID-19
24. Not applicable – I don't feel stressed

Coping2 Please indicate how your use of any of the following has been impacted by the COVID-19 pandemic? (Please select one option on each row)

1. Consumption of alcohol
2. Use of tobacco products (e.g. cigarettes, cigars, chewing tobacco, vaping, etc.)
3. Use of cannabis products
4. Use of prescribed medication
5. Use of other psychoactive substances (e.g., cocaine, heroin)
6. Gambling
7. Eating too much
8. Eating too little
9. Screen time

1. More
2. Less
3. No change
4. Not applicable
5. Prefer not to say

The following questions are on the topic of self-harm and suicidal thoughts. We understand this can be a sensitive topic, so please remember that your answers are anonymous. If you are in crisis, please call 1-833-456-4566 toll free (In QC: 1-866-277-3553), 24/7 or visit www.crisisservicescanada.ca

Self-harm1 Have you done or experienced any of the following, as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select one option on each row)

1. Experienced suicidal thoughts/feelings
2. Deliberately hurt myself
3. Worried about someone close to me experiencing suicidal thoughts/feelings or deliberately hurting themselves

    1. Yes
    2. No
    3. Prefer not to say

    [if yes to above] Self-harm2 How often have you done each of the following as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select one option on each row)

    1. Experienced suicidal thoughts/feelings
    2. Deliberately hurt myself
    3. Worried about someone close to me experiencing suicidal thoughts/feelings or deliberately hurting themselves

        1. Once a day or more often
        2. Nearly everyday day
        3. A few times a week
        4. Passing thoughts
        5. Don't know
        6. Prefer not to say

Mental Health Support (Open-ended) If you could offer advice to others about how to support mental wellbeing during the COVID-19 pandemic, what would it be?

_____

Demographics

Gender identity Which gender do you most identify with?

1. Man
2. Woman
3. Transgender woman/trans woman
4. Transgender man/trans man
5. Non-binary
6. Two-Spirit
7. Not listed
8. Prefer not to answer

Ethnicity What is your family ethnicity? (Check all that apply)

1. Indigenous origins (for example, First Nations, Inuit, Métis)
2. East Asian origins (for example, Chinese, Japanese, Korean)
3. South Asian origins (for example, Indian, Punjabi, Pakistani)
4. Southeast Asian origins (for example, Filipino, Thai, Vietnamese)
5. Latin American origins (for example, Brazilian, Cuban, Bolivian)
6. European origins (for example, British, German, Russian)
7. Middle Eastern origins (for example, Iranian, Iraqi, Afghan)
8. African origins (for example, Nigerian, Ghanaian, Zimbabwean)
9. Other (please specify) _____
10. Don't know
11. Prefer not to answer

Sexuality Do you identify as being LGBT2Q+ (lesbian, gay, bisexual, trans, two-spirit, queer, etc.)?

1. Yes
2. No
3. Unsure
4. Prefer not to answer

Disability Do you identify as a person with a disability?

1. Yes
2. No
3. Prefer not to answer

Mental health Do you identify as a person who has a pre-existing (prior to COVID-19) mental health condition?

1. Yes
2. No
3. Prefer not to answer

Citizenship Which of the following best describes your Canadian citizenship status?

1. Canadian citizen by birth
2. Canadian citizen by naturalization
3. Landed immigrant/Permanent resident
4. Refugee
5. Not a citizen

Parent/Guardian status Which of the following best describes your parental/guardian status? (Please select all that apply)

1. Not a parent / guardian
2. Parent / guardian (any age)

    [If yes to parent/guardian] Children in household How many children (under 18 years of age) reside in your household?

        1. 0
        2. 1
        3. 2
        4. 3+

    [If yes to parent/guardian] Child's Age What age group is/are your child/children? (Please select all that apply)

        1. 4 years and under
        2. 5-11 years
        3. 12-17 years
        4. 18 years and over

[if yes to parent/guardian] Child Mental Health Compared to before the COVID-19 pandemic and related restrictions in Canada, how would you say the mental health of your child/children is now?

1. Significantly better now
2. Slightly better now
3. About the same
4. Slightly worse now
5. Significantly worse now
6. It is affecting my children differently (some feel better/some feel worse)
7. Prefer not to answer

[if yes to parent/guardian] Child Coping Strategies Which do you think have helped **your child(ren)** cope with stress related to COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Connecting with family who live outside our home (e.g. phone, video chat, text etc.)
2. Connecting with friends (e.g. phone, video chat, text etc.)
3. Contacting a **school or community-based** mental health worker or counsellor **virtually** (e.g. via phone, video chat, etc.)
4. Receiving **in-person** mental health supports
5. Staying in touch with teachers, school adults, childcare providers **virtually** (e.g. phone, video chat, text etc.)
6. Accessing virtual mental health resources through medical professionals (e.g. online cognitive behavioural therapy, etc.)
7. Accessing virtual educational or self-help mental health resources through websites, apps, or phone (e.g., Headspace, KidsHelpPhone)
8. Participating in a child/youth support group
9. Maintaining a healthy lifestyle (e.g. balanced diet, enough sleep, exercise, etc.)
10. Maintaining family routines (e.g., family meals, bedtime routines)
11. Keeping up to date with relevant information (e.g. TV news, newspapers, online information, etc.)
12. Limiting their exposure to the news about COVID-19
13. Limiting their exposure to social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
14. More time for social media use (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
15. Going for a walk/exercise outside
16. Exercising in our home
17. Spending time with pet(s)
18. Playing outdoors

19. Playing inside (e.g., games, toys, telling stories)
20. Doing a hobby (e.g., music, reading, arts & crafts)
21. Volunteering to help
22. Other [open] please specify

_____

23. Don't know
24. Not applicable
25. Nothing has helped my child(ren) to cope with stress related to COVID-19

[if yes to parent/guardian] Parent-Child Interactions Please indicate how each of the following have been impacted by the COVID-19 pandemic. (Please select one option on each row)

1. Having quality time with my child(ren)
2. Feeling closeness with my child(ren)
3. Showing love or affection to my child(ren)
4. Observing resilience (strength and perseverance) in my child(ren)
5. Disciplining my child(ren)
6. Conflicts with my child(ren)
7. Using harsh words with my child(ren)
8. Yelling/shouting at my child(ren)
9. Spanking or hitting my child(ren)

1. More
2. Less
3. No change
4. Not applicable
5. Prefer not to say

Household living Which of the following best describes your living arrangements? (Please select all that apply)

1. I live alone
2. Living with a spouse or partner
3. Living with friend(s) or housemate(s)
4. Living with siblings
5. Living with my child(ren) who are over 18
6. Living with my child(ren) who are under 18
7. Living with other adult family members (e.g., parents, grandparents)
8. Living with grandchildren
9. Other
10. Prefer not to answer
11. None of the above

Age demographics Which age category do you belong to?

1. 18-24 years
2. 25-34 years
3. 35-44 years
4. 45-54 years
5. 55-64 years
6. 65-74 years
7. 75 +

Geographic region In which province or territory of Canada do you live?

1. Alberta
2. British Columbia
3. Manitoba
4. New Brunswick
5. Newfoundland and Labrador
6. Northwest Territories
7. Nova Scotia
8. Nunavut
9. Ontario
10. Prince Edward Island
11. Quebec
12. Saskatchewan
13. Yukon

Rural Urban Do you live in a rural or urban area?

1. Rural
2. Urban

Education Which of the following best describes your highest education level?

1. Less than high school completion
2. High school completion (or equivalent)
3. Some post-secondary education
4. Post-secondary certificate or diploma
5. Undergraduate degree
6. Graduate or professional degree
7. Other _____
8. Prefer not to answer

Marital Status Which of the following best describes your current marital status?

1. Single (never been married)
2. Married or in a domestic partnership
3. Divorced/Separated
4. Widowed
5. Other (please specify) _____
6. Prefer not to answer

Income Which of the following is the best estimate of your overall household income last year before taxes?

1. Under $20,000
2. $20,000 to $49,999
3. $50,000 to $74,999
4. $75,000 to $99,999
5. $100,000 to $149,999
6. $150,000 to $199,999
7. $200,000 or more
8. Prefer not to answer

Thank you for taking part in this survey. If you've been affected by this topic and would like any more information, need advice, or support, you can go to the following place for help:
Canadian Mental Health Association

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5 supplementary file
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5
		(b) Indicate number of participants with missing data for each variable of interest	NA

Outcome data	15*	Report numbers of outcome events or summary measures	5-7
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-7
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-9
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	9
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	9-10
Generalisability	21	Discuss the generalisability (external validity) of the study results	9-10
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Examining the impacts of the COVID-19 pandemic on family mental health in Canada: Findings from a national cross-sectional study

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Abstract

Objectives: In the first wave of the COVID-19 pandemic, social isolation, school/child care closures, and employment instability have created unprecedented conditions for families raising children at home. This study describes the mental health impacts of the COVID-19 pandemic on families with children in Canada.

Design, setting, participants: This descriptive study utilized a nationally representative, cross-sectional survey of adults living in Canada (N=3000) to examine the mental health impacts of the COVID-19 pandemic. Outcomes among parents with children <18 years old living at home (n=618) were compared to the rest of the sample. Data were collected via online survey between May 14-29, 2020.

Outcome measures: Participants reported on changes to their mental health since the onset of the pandemic and sources of stress, emotional responses, substance use patterns, and suicidality/self-harm. Additionally, parents identified changes in their interactions with their children, impacts on their children's mental health, and sources of support accessed.

Results: 44.3% of parents with children <18 years living at home reported worse mental health as result of the COVID-19 pandemic compared to 35.6% of respondents without children <18 living at home, χ^2 (1, *N*=3000) = 16.2, *p*<.001. More parents compared to the rest of the sample reported increased alcohol consumption (27.7% vs 16.1%, χ^2 (1, *N*=3000) = 43.8, *p*<.001), suicidal thoughts/feelings (8.3% vs 5.2%, χ^2 (1, *N*=3000) = 8.0, *p*=.005), and stress about being safe from physical/emotional domestic violence (11.5% vs 7.9%, χ^2 (1, *N*=3000) = 8.1, *p*=.005). 24.8% (95% CI 21.4-28.4) of parents reported their children's mental health had worsened since the pandemic. Parents also reported more frequent negative as well as positive interactions with their children due to the pandemic (e.g., more conflicts, 22.2% (95% CI 19.0-25.7); increased feelings of closeness, 49.7% (95% CI 45.7-53.7)).

Conclusions: This study identifies that families with children <18 at home have experienced deteriorated mental health due to the pandemic. Population-level responses are required to adequately respond to families' diverse needs and mitigate the potential for widening health and social inequities for parents and children.

Article Summary

Strengths and limitations of the study

- Survey items were informed by a longitudinal COVID-19 mental health survey, first commissioned by the UK Mental Health Foundation and developed in consultation with people with lived experience of mental health conditions; Adaptations were made for the Canadian context and to support analyses focused on issues of equity.
- The large sample size enabled subgroup analyses in mental health according to gender, age, pre-existing mental health conditions, disabilities, and household demographics.
- Targeted sampling ensured participation from families of diverse backgrounds.
- Cross-sectional observational design and lack of adjustment for potential confounding prohibits causal inference.

Keywords: Mental health, Public health, Community child health, Epidemiology, COVID-19

Introduction

The COVID-19 pandemic has led to unprecedented global morbidity and mortality, with population mental health impacts recognized as a growing concern, and particular risks identified within the family context (1). Specifically, the COVID-19 pandemic has posed new threats to families through social isolation due to physical distancing measures, school/child care closures, financial and employment insecurity, housing instability, and changes to health and social care access (2). These shifts have profoundly interrupted the systems and structures that previously operated to both support the mental health and wellbeing of families and mitigate the risks that contribute to health and social inequities.

During the pandemic, many parents have experienced increased pressures and erosions to social supports, with implications for their mental health. In a US survey, the majority of parents expressed that during the pandemic concerns about finances, social isolation, criticism from others, as well as emotional experiences of sadness and loneliness were affecting their parenting (3). Globally, school and childcare closures and the hiatus of after-school activities has added to parental pressure to balance responsibilities, including becoming the sole providers of supervision and education for their children – all while experiencing heightened financial and emotional stress (4). Families generally are affected by the disruptions of the pandemic. However, these pressures disproportionately affect families who experience health and social inequities including fewer financial and social resources, crowded homes, and limited technology and internet access (4–6). It has been argued that the collision of these stressors will likely contribute to increases in domestic violence (7), and emerging studies have shown increased frequency of shouting and physical punishment of children since the pandemic began (3).

In Canada, federal and provincial governments began implementing lockdown measures mid-March 2020 including border closures and restricted travel, restrictions on group gatherings, school closures, mandatory working from home, and temporary suspension of non-essential health and public services (8). National COVID-19 incidence rates peaked in April with nearly 3,000 new cases confirmed daily (9). By early May, incidence rates were decreasing and provinces began easing lockdown measures including re-opening businesses and encouraging rehiring of employees (8). However, there were indications that the pandemic was already impacting the mental health and wellbeing of Canadian children.[1] By April, reports showed a dramatic surge in calls documented by Kids Help Phone, a national helpline for young people, with a 48% increase in calls about social isolation, a 42% increase in calls about anxiety and stress, and a 28% increase in calls about physical abuse (10). Experts raised alarms that disruptions to routines and services, combined with increased family stressors, social isolation, and domestic violence, were creating conditions that risked increasing child mental health problems on an unprecedented scale, with children from marginalized and socioeconomically disadvantaged backgrounds likely to be disproportionately affected (11). Thus, while young people initially appear to be less susceptible to the physical effects of the virus, they are experiencing significant challenges, likely resulting from the social and economic impacts of the pandemic within their family contexts. This is particularly concerning as research consistently demonstrates that children's early exposures to stress can have lasting effects (12–15).

Families and children are furthermore supported by a social ecological system that has been forced to adapt quickly to support families' needs, often with limited information or evaluation. School and childcare closures due to the pandemic are concerning not only for the disruption to typical classroom learning, but also for the loss of systems-level safeguards such as nutrition programs, after-school care,

[1] For the context of this study, children are defined as children and youth below the age of 18.

school health and counseling services, and vaccination clinics (16) that seek to mitigate some consequences of health and social inequities among structurally vulnerable children and families. And yet, even as schools and workplaces start to re-open, the health risks of returning to populated spaces (including public transit) will disproportionally affect families with lower incomes, fewer resources, and with limited options for returning to work (17). Furthermore, families, childcare settings, and schools are nested within health authorities and government structures that determine many of the policies, services, and financial and employment supports available to parents as well as the availability of these supports beyond the pandemic.

This paper presents findings on the impact of the COVID-19 pandemic on families from the first wave of a nationally representative cross-sectional survey monitoring the mental health of people living in Canada. The study aimed to answer three questions: a) How is the COVID-19 pandemic affecting the mental health of parents and children and what subpopulations or subgroups are most impacted by the pandemic? b) How have parent-child interactions changed due to the pandemic? and c) What are the factors that support mental health in the family context? The findings provide critical evidence to inform rapid, data-driven public health responses to meet the mental health needs of families and children in the context of the COVID-19 pandemic and beyond.

Methods

Survey development and approach

This investigation focuses on data from the initial wave of our cross-sectional survey, *"Assessing the Impacts of COVID-19 on Mental Health."* The study represents a unique collaboration between academic researchers from the University of British Columbia, the Canadian Mental Health Association (Canada), and by an international research partnership with the Mental Health Foundation (UK).

Patient and public involvement

Survey items were informed by a longitudinal survey first commissioned by the Mental Health Foundation in March 2020 and developed in consultation with people with lived experience of mental health conditions via a citizen's jury participatory methodology process. The citizen's jury was a collaborative process that engaged people with diverse experiences and backgrounds in the development and interpretation of the research to enhance its relevance and impact, including insights on stressors, coping strategies, and mental health (18,19). Items on family mental health were adapted from previously developed community survey items related to the COVID-19 pandemic from the University of Michigan (3). Modifications were made by the research team in consultation with collaborators from the Canadian Mental Health Association to reflect the Canadian context, aimed at examining indicators of mental health, stress, and coping related to the COVID-19 pandemic among the Canadian population. Modifications included adding items on the impacts on young people's mental health, potential sources of support, family dynamics, financial interventions introduced by the Government of Canada in response to the pandemic (e.g., Canada Emergency Response Benefit), and food security systems. Survey items are provided in Additional File 1.

Procedure

Data were collected between May 14-29, 2020, via a rapid online survey distributed by polling vendor Maru/Matchbox. Participants (n=3,000) were randomly selected members of the Maru Voice Canada panel, consisting of approximately 125,000 Canadian adults. Surveys were distributed to 3558 panel members to reach a total of 3,000 respondents, yielding an invitation-to-response rate of 84%. Panel participants were recruited through direct email, with targeted sampling through affiliate community partners to increase inclusion of populations that may be difficult to reach via the internet (e.g., older adults, people of ethnic minority) (20). Population representativeness was achieved through use of a balancing matrix, involving a combination quota sampling and response propensity statistics (20). The data collection period captured the first phases of "re-opening" across many Canadian provinces and territories, emerging from approximately two months of mandated physical distancing, school/child care and work closures, and related disruptions.

All participants completed an online consent process prior to beginning the survey and were provided with a small honorarium through Maru/Matchbox to compensate for their time. Ethics approval was provided by the Behavioural Research Ethics Board at the University of British Columbia (H20-01273).

Measures and Analyses

This investigation focuses on a subsample of participants who identified as parents with children <18 years old currently living at home (n=618). Changes in mental health due to the pandemic were compared between this parent subsample and the rest of the sample (i.e., respondents who were not parents with children <18 living at home). Comparisons were also conducted within the subsample of parents. Participants completed sociodemographic questions as well as survey questions about their mental health, emotional responses to the pandemic, changes in substance use, experiences of suicidal thoughts, and self-harm. Parents also completed questions on changes to parent-child interactions, impacts of the pandemic on their children's mental health, and were asked to identify sources of stress and support for themselves and their children.

Descriptive and bivariate analyses (frequencies, chi square tests) were used to examine self-reported changes in mental health since the onset of the pandemic across groups defined by gender, age, disability, and pre-existing mental health conditions, as well as frequently identified stressors, supports, and changes in parent-child interactions. Data were analyzed using SPSS version 26 (21). The maximum margin of error for proportions derived from the parent subsample was +/- 3.9% at a 95% level of confidence. This was a complete case analysis. In chi squared analyses, "don't know," "not applicable," and "prefer not to answer" responses were treated as "not yes."

Results

Sample description

Of the 3,000 respondents, 618 identified as parents to a child <18 living at home.[2] The parent subsample consisted of 52% women and the average age was 43.0 years (SD=9.0 years). Further sample characteristics are presented in Table 1.

- Insert Table 1 -

Pandemic-related changes in parent mental health

Parents identified more pandemic-related risks and vulnerabilities compared to respondents without children <18 years living at home across a number of mental health constructs. Since the onset of the COVID-19 pandemic, a significantly higher proportion of parents reported deteriorated mental health (44.3%) compared to 35.6% among their counterparts without children <18 years at home, χ^2 (1, N = 3000) = 16.2, p < .001. Changes to mental health furthermore varied across sociodemographic characteristics within the parent subsample (Table 2). Among parents with children at home, deteriorated mental health was significantly more prevalent among women, parents under age 35, parents of younger children (≤ 4 years), parents with a pre-existing mental health condition, parents with a disability, and parents reporting financial stress. When asked about their emotions in the past two weeks as a result of the COVID-19 pandemic, the most frequent response from parents was anxious and worried (51.9%; 95% CI 47.9-55.9), followed by stressed (46.1%; 95% CI 42.1-50.1), and bored (39.5%; 95% CI 35.6-43.5).

- Insert Table 2 -

Overall, 8.3% of parents reported experiencing suicidal thoughts/feelings as a result of the COVID-19 pandemic in the past two weeks compared to 5.2% among their counterparts without children at home, χ^2 (1, N = 3000) = 8.0, p = .005. Furthermore, 2.6% of parents reported deliberately hurting themselves as a result of the pandemic in the past two weeks compared to 1.3% among their counterparts, χ^2 (1, N = 3000) = 4.8, p = .028.

As a means of coping with deteriorations in mental health and stressors of the pandemic, many parents identified an increase in alcohol use. Specifically, 27.7% of parents reported increased alcohol consumption compared to 16.1% among those without children at home, χ^2 (1, N = 3000) = 43.8, p < .001. Within the parent subsample, increased alcohol consumption was more prevalent among men (32.3%) compared to women (23.5%), χ^2 (1, N = 618) = 6.0, p = .014.

Pandemic-related stressors

As shown in Figure 1, when asked about stressors and worries resulting from the COVID-19 pandemic in the past two weeks, parents most frequently reported mental health impacts, physical health threats related to the pandemic, and relational and financial concerns. Being able to cope with uncertainty (59.2%; 95% CI 55.2-63.1), fear of a family member getting sick or dying (58.9%; 95% CI 54.9-62.8), and being separated from friends and family (58.7%; 95% CI 54.7-62.7) were the most frequent responses. A

[2] In the following when we refer to parents, these are parents living with children <18 years old unless otherwise specified.

large proportion also reported being stressed about financial concerns (45.6%; 95% CI 41.2-49.7), losing/loss of job (31.4%; 95% CI 27.8-35.2), and having enough food to meet their household's basic needs (20.4%; 95% CI 17.3-23.8). 36.9% (95% CI 33.1-40.8) of parents reported being stressed about looking after children while continuing to work and 27.8% (95% CI 24.3-31.6) were stressed that the pandemic would make their existing mental health problems worse.

Relationship challenges were also a prominent concern among parents. For example, 28.3% (95% CI 24.8-32.1) of parents reported being stressed about experiencing relationship challenges with their partner and 11.5% (95% CI 9.1-14.3) reported being stressed about being safe from physical or emotional domestic violence during the two weeks prior. This proportion identifying concern about being safe from domestic violence was significantly higher among parents compared to the rest of the sample (7.9%), χ^2 (1, N = 3000) = 8.1, p =.005. Within the parent subsample, men (14.6%) were more likely to report being stressed about being safe from physical or emotional domestic violence than women (8.6%), χ^2 (1, N = 618) = 5.4, p =.020.

- Insert Figure 1-

Child mental health and parent-child interactions

The majority of parents (59.7%; 95% CI 55.7-63.6) reported their children's mental health had stayed the same since the onset of the COVID-19 pandemic; however, 24.8% (95% CI 21.4-28.4) indicated that their child or children's mental health had worsened.

Overall, due to the COVID-19 pandemic, parents reported more negative interactions with their children, including more conflicts (22.2%; 95% CI 19.0-25.7), yelling/shouting (16.7%; 95% CI 13.8-19.8), disciplining (16.0%; 95% CI 13.2-19.2), and using harsh words (10.7%; 95% CI 8.4-13.4). However, overall, parents also reported that they experienced increased positive interactions, including having more quality time (65.4%; 95% CI 61.5-69.1), feeling closeness (49.7%; 95% CI 45.7-53.7), showing love or affection to their children (44.5%; 95% CI 40.5-48.5), and observing increased resilience (strength and perseverance) in their children (38.2%; 95% CI 34.3-42.2). Parents often reported increases in both negative and positive interactions due to the COVID-19 pandemic. For example, a higher proportion of parents who reported more conflicts with children also reported increased feelings of closeness (59.1%) compared to parents who did not report more conflicts with children (47.0%), χ^2 (1, N = 618) = 6.3, p = .012.

Changes in parent-child interactions also varied according to salient sources of stress (i.e., financial concerns and the pandemic causing existing mental health problems to become worse). A higher proportion of parents reported increased harsh words with children when they were stressed about finances (13.8%) compared to parents who did not report this stressor (8.0%), χ^2 (1, N = 618) = 5.4, p = .020. Parents who reported stress that the pandemic would make an existing mental health problem worse, compared to parents without this stressor, also more frequently reported increased harsh words with children since the pandemic (20.9% vs 6.7%), as well as increased discipline (23.8% vs 13.0%), conflicts (33.1% vs 17.9%), and yelling/shouting (31.4% vs 11.0%), χ^2 (1, N = 618) = 10.8-37.2, p's $\leq$ .001.

Interestingly, a higher proportion of parents stressed about financial concerns, compared to parents who did not report this stressor, also reported increased quality time with children (71.6% vs 60.1%), showing more love and affection to their children (49.3% vs 40.5%), and observing resilience in their children (43.3% vs 33.9%), χ^2 (1, N = 618) = 4.82-8.98, p's < .028. A higher proportion of parents stressed about an existing mental health problem also reported showing more love and affection to children as a result of the pandemic (53.5%) compared to parents without this stressor (41.0%), χ^2 (1, N = 618) = 7.8, p < .005.

Sources of support

Parents most frequently identified going for a walk/exercise (59.1%; 95% CI 55.1-63.0), connecting with family and friends (50.5%; 95% CI 46.5-54.5), and maintaining a healthy lifestyle (37.9%; 95% CI 34.0-41.8) as strategies that had helped them cope with stress related to the COVID-19 pandemic in the past two weeks. Parents most frequently identified these same strategies, as well as maintaining family routines (53.9%; 95% CI 49.9-57.9), as having helped their children cope with stress related to the pandemic (Figure 2).

Specific to children's stress, 34.0% (95% CI 30.3-37.9) of parents identified staying in touch with teachers, school adults, and child care workers as a source of support during the pandemic, and 5.8% (95% CI 4.1-8.0) identified accessing virtual educational or self-help mental health resources (e.g., websites, apps) as a strategy that had helped their children. Additionally, 4.2% (95% CI 2.8-6.1) of parents had contacted a school or community-based mental health worker or counsellor virtually (e.g., via phone or video-chat).

Regarding structural supports, a significantly higher proportion of parents (23.3%) identified having a supportive employer as a factor that helped their stress related to the pandemic in the past two weeks, compared to respondents without children at home (14.1%), χ^2 (1, N = 3000) = 30.9, p < .001. Although overall access of structural supports was low, a significantly higher proportion of parents reported accessing federal financial benefits to help cope with stress in the past two weeks (13.6%) compared to the rest of the sample (9.2%), χ^2 (1, N = 3000) = 10.2, p = .001. When restricted to parents stressed about financial concerns due to the COVID-19 pandemic (n=282), this proportion increased to 19.1% (95% CI 14.7-24.2). Finally, a significantly higher proportion of parents (7.9%) reported that they or a member of their household had accessed a food-based community program since the onset of the pandemic such as the Food Bank, free meal programs, community kitchens, or food vouchers from a charity, compared to the rest of the sample (4.4%), χ^2 (1, N = 3000) = 12.5, p < .001. When restricted to parents stressed about having enough food to meet household needs due to the COVID-19 pandemic (n=126), this proportion increased to 17.5% (95% CI 11.3-25.2).

- Insert Figure 2 -

Discussion

This study identifies that following the first lockdown phase in Canada, 44.3% of parents of children <18 living at home reported worse mental health as a result of the pandemic. Throughout the first five months of the pandemic internationally, studies of population mental health – including studies from

China and the United States - estimated prevalence rates of up to 51% for anxiety symptoms, up to 48% for depressive symptoms, and up to 54% for symptoms of psychological distress (22). Within parts of Canada, the prevalence of depressive symptoms has more than doubled compared to previous national estimates (23), with experts projecting national increases in suicide based on trends in unemployment (24). To our knowledge, this is the first national Canadian study to identify that parents of children <18 living at home are a group at disproportionate risk due to the COVID-19 pandemic. Compared to the rest of the population, a larger proportion of parents with children <18 at home reported increased alcohol consumption as a result of the pandemic, and suicidal thoughts or feelings, self-harm, and stress about being safe from physical or emotional domestic violence in the past two weeks. These data validate early public health concerns regarding the likely increase in alcohol consumption, suicide and self-harm, and domestic violence associated with the pandemic (1,7,25). Within the parent subsample, women, younger parents, parents of small children, those living with a disability and those with a pre-existing mental health condition reported worsened mental health since the start of the pandemic compared to other parents.

Within the parent subsample, more men with children living at home reported increased alcohol use and being stressed about domestic violence compared to women. This gender difference in alcohol use aligns with pre-pandemic research finding that men generally consume more alcohol than women and are more likely than women to externalize distress through increased alcohol consumption (26,27). However, the finding that men reported greater worry and stress from domestic violence than women is contrary to pre-pandemic studies showing that women are disproportionately affected by domestic violence (28,29). Our survey question specifically asked about stress/worries about being safe from physical or emotional domestic violence as a result of the COVID-19 pandemic, which may not be comparable with previous studies. This necessitates further research to unpack this association in the context of social isolation, financial stress, and parenting responsibilities.

Parents with children <18 at home reported unique pressures, including worrying about their children's health, mental health, education, and being stressed about looking after children while continuing to work. A high proportion of parents reported being stressed about financial concerns (45.6%), about the pandemic making their existing mental health problems worse (27.8%), and about having enough food to meet their household's basic needs (20.4%). A larger proportion of parents indicating stress about financial concerns or worsening of existing mental health problems due to the pandemic reported negative interactions with their children, including increased conflicts, discipline, use of harsh words, and yelling/shouting compared to parents without these stressors. This aligns with other research showing that children have been relatively overlooked as a population vulnerable to the impacts of the COVID-19 virus, but are particularly vulnerable to stressful conditions exacerbated by the pandemic including financial stress, food insecurity, domestic violence, and disrupted systems of care and education (30,31).

However, the majority of parents also reported increased positive interactions at home, including having more quality time together, feeling closeness, showing love and affection, and observing resilience in their children. Parents often reported increases in both negative and positive interactions with children due to the COVID-19 pandemic, possibly due to increased opportunities for family interactions overall. Furthermore, a larger proportion of parents stressed about financial concerns due to the pandemic reported having more quality time, showing more love and affection, and observing resilience in their children. A larger proportion of parents stressed about worsening mental health problems reported showing more love and affection with their children. Increased time and flexibility at home has created conditions for families to engage in more conversations and activities together (32,33). Previous

research has found that while parenting pressures during the pandemic have increased, so have opportunities to strengthen family connectedness (4). Our results indicate that strengthened connectedness may be particularly salient for families experiencing heightened stress due to the pandemic, although the specific mechanisms underlying these associations are unclear.

Free digital technologies have furthermore facilitated connecting with others outside the home, as well as tools for managing parenting stress and enabling children to participate in school and child-friendly activities online (4,5,33). However, digital technologies and online learning are not easily accessible for everyone, particularly for families with limited internet or digital device access and language barriers, and for children with learning difficulties and special needs. In the current study, fewer than 6% of families reported accessing virtual mental health supports as strategies for addressing children's stress related to the pandemic. Although online mental health services have been found to be effective, feasible, and acceptable among adults and youth (34), real-world uptake and retention has generally been found to be low (35,36). Early COVID-specific research from China has found that uptake of any mental health services since the start of the pandemic has been as low as 3.7%, with concerns raised that online mental health services may still not address present needs due to existing digital divides, appropriateness for all populations, and quality assurance (37).

Considering the needs of diverse families, as well as issues of health equity, early examinations of the COVID-19 pandemic have also emphasized the importance of community organizations and governments in providing access to economic and social supports (38,39). In the current study, a significantly greater proportion of parents with children < 18 living at home compared to the rest of the population had relied on supportive employers and government financial supports in the past two weeks, and had accessed food programs since the start of the pandemic. Parents also frequently identified school, community, and government supports that had helped them and their children cope with stress related to the COVID-19 pandemic. Other studies have also identified supports such as paid emergency leave, unemployment insurance, rent protection, and access to safe and secure housing and outdoor spaces as critical in supporting parents to have the time and resources necessary to care for their children (38,39). Although these policies and relief systems may not have been designed specifically for families and children, they hold the potential to address the underlying causes (40) of compromised parent and child mental health at the population level, including family financial stress, employment and food insecurity, stigma, overcrowding, and violence. The effectiveness of these policies, however, will depend on the human resources to organize, distribute, and implement services when workforces are already overloaded. For example, in the current study, fewer than one in five families with financial stress or concerns about having enough food to meet their household basic needs had recently accessed federal benefits or food programs, respectively, warranting further investigation into the ease of access to these services (41). Furthermore, many of these underlying causes of health inequities will remain after the COVID-19 crisis has subsided (42), suggesting that many of these interventions should be sustained irrespective of the pandemic.

Strengths and Limitations

A notable strength of this study was the large, nationally representative sample that enabled population subgroup analyses to examine disparities in mental health. The study was designed to include participation from families of diverse backgrounds, although small numbers of parents identifying as Indigenous or LGBT2Q+ prohibited us from examining other social inequities of interest. We also did not have a reliable measure of single parent status to investigate mental health trends among this group.

Although strategies including oversampling and community partnerships were used to minimize selection bias and reduce possible technology barriers, it is possible that survey respondents differed from survey non-respondents on key measures of interest including mental health, financial security, or family conflict, which may have affected our estimates. The study design was cross-sectional, therefore we cannot determine if outcomes such as parent-child interactions and parent stressors were causally related, only that they were associated. We also did not control for potential confounding variables that might have introduced bias; further in-depth investigations would complement this study by providing more understanding of these associations. This study did not measure the prevalence of specific mental health outcomes or include clinical assessments of mental illness which may limit comparability with other research. This study also did not take into account baseline measures of mental health or multiple comorbidities, and was specific to the Canadian context during the first re-opening phase of the COVID-19 pandemic. It will be important to monitor the impact of the pandemic on family mental health over time and in different contexts. We were also unable to assess the impact of the pandemic from the perspectives of children and youth themselves, including children's reactions to parents' stress during the pandemic and children's reported supports including use of mental health services. This is a critical knowledge gap for future research to address. The purpose of the current study was to assess preliminary impacts of the COVID-19 pandemic on families' general mental health at a community level and to provide early data to inform relevant policy and programming actions. Examining specific impacts on the prevalence of mental health disorders and effective clinical responses is an important focus for future research.

Conclusions and implications

In response to the COVID-19 pandemic, policymakers and service providers globally have been faced with the challenge of having to make rapid decisions that will have immediate and long-term effects on the mental health and well-being of families and children. In the early days of the first "re-opening" phase in Canada, nearly two in every five people reported worse mental health since the pandemic began, with this proportion increasing to nearly one in every two people for parents with children <18 living at home. Schools, communities, and government systems play an essential role in protecting and supporting parents and children, particularly for families without reliable access to the internet or virtual technologies. While pressure is put on parents, it is important to remember that families exist within a social ecosystem with opportunities to promote child and youth mental health. Supports such as affordable child care, low barrier internet access, publicly-funded stepped care and psychotherapy, and easily available financial supports are interventions that can directly benefit families (33,43). Continuations of financial interventions beyond the pandemic have also been suggested, including the idea of a universal basic income (44). The effectiveness of these systems further depends on intersectoral communication, collaboration, and action, and therefore seeking feedback and advice from community stakeholders will be critical for monitoring whether these systems are working for families and children moving forward.

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Author statement (contributions)
AMG, KCT, MG, EJ, and CM co-led the conceptualization of this investigation. AMG directed the data analyses, interpretation and writing of this manuscript. KCT conducted the data analyses and contributed to data interpretation and writing of this manuscript. EJ, CGR, MG, CM, and SH contributed to the interpretation and writing of this manuscript.

Data statement
Data available upon reasonable request.

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Table 1. Sociodemographic characteristics of the parent subsample (n=618)

		Sample distribution	
		n	%
PARENT DEMOGRAPHICS			
Gender			
	Men	294	47.6%
	Women	324	52.4%
Age			
	18-34	130	21.1%
	35-44	214	34.6%
	45-54	235	38.0%
	55+	39	6.3%
Province of residence			
	Alberta	86	13.9%
	British Columbia/Territories	81	13.1%
	Manitoba/Saskatchewan	49	7.9%
	Ontario	243	39.3%
	Atlantic Provinces	43	7.0%
	Quebec	116	18.8%
Rural vs urban			
	Urban	531	85.9%
	Rural	87	14.1%
Education			
	High school or less	62	10.0%
	Some college/university	226	36.6%
	University+	330	53.4%
Marital status			
	Single, never married	39	6.3%
	Married or partnered	517	83.7%
	Separated, divorced, widowed	62	10.0%
Household Income			
	<$50K	108	17.5%
	$50K to <$100K	197	31.9%
	$100K+	313	50.6%

Employment status			
	Unemployed (due to COVID-19)	86	13.9%
	Unemployed (prior to COVID-19)	21	3.4%
Lesbian, Gay, Bisexual, Transgender, Two-Spirit, and Queer or Questioning			
	Yes	24	3.9%
Pre-existing mental health condition			
	Yes	111	18.0%
Disability			
	Yes	45	7.3%
Ethnicity			
	Indigenous origins (e.g., First Nations, Inuit, Métis)	17	2.8%
	Visible minority (e.g., Asian, Latin American, Middle Eastern, African)	122	19.7%
	European origins (e.g., British, German, Russian)	394	63.8%
Household Living			
	Living with a spouse or partner	500	80.9%
	Living with other adult family members (e.g., parents, grandparents)	26	4.2%
	Living with grandchildren	11	1.8%
CHILD DEMOGRAPHICS			
Child age (check all that apply)			
	4 years and under	183	29.6%
	5-11 years	292	47.2%
	12-17 years	309	50.0%
	18 years and over	70	11.3%
Child siblings at home			
	Yes	325	52.6%

Table 2. Changes in parent self-reported mental health since the onset of the COVID-19 pandemic

		GENDER		AGE		PRE-EXISTING MENTAL HEALTH CONDITION		DISABILITY		UNEMPLOYED DUE TO COVID-19		PARENT TO A CHILD <4 YEARS OLD		PARENT TO A CHILD 5-11 YEARS OLD		PARENT TO A CHILD 12-17 YEARS OLD		PARENT WITH MULTIPLE CHILDREN AT HOME		FINANCIAL CONCERNS	
	Total (n=618)	Female (n=324)	Male (n=294)	<35 yrs (n=130)	35+ yrs (n=488)	Yes (n=111)	Not yes (n=507)	Yes (n=45)	Not yes (n=573)	Yes (n=86)	No (n=532)	Yes (n=183)	No (n=435)	Yes (n=292)	No (n=326)	Yes (n=309)	No (n=309)	Yes (n=325)	No (n=293)	Yes (n=282)	Not Yes (n=336)
Worse Mental Health	274 44.3%	158 48.8%*	116 39.5%	70 53.8%*	204 41.8%	74 66.7%**	200 39.4%	27 60.0%*	247 43.1%	44 51.2%	230 43.2%	101 55.2%**	173 39.8%	124 42.5%	150 46.0%	121 39.2%*	153 49.5%	138 42.5%	136 46.4%	147 52.1%**	127 37.8%

*p<.05, **p<.001

Worse mental health combines slightly and significantly worse mental health. Differences in proportions within groups were tested with Chi-squared tests.
Due to small sample sizes, Indigenous origins and sexuality (Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning) are not reported.

Figure Captions

Figure 1. Parent stressors in the past two weeks as a result of COVID-19

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

Figure 2. Parent-identified supports for addressing children's stress related to COVID-19 in the past two weeks

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

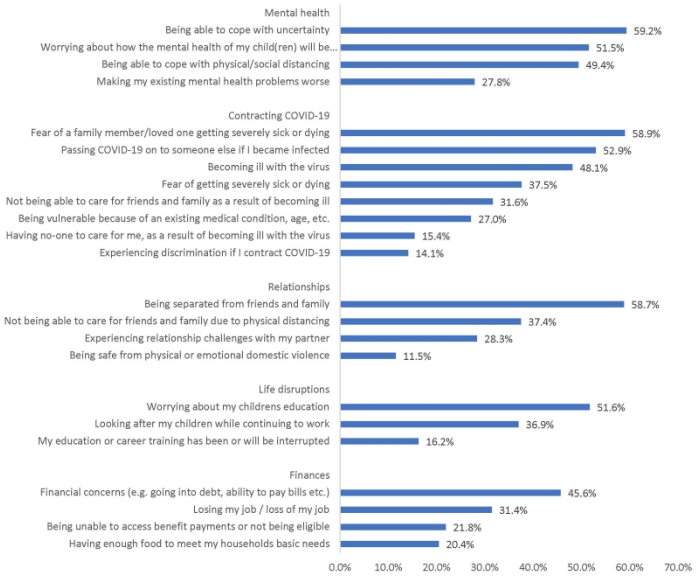

Figure 1. Parent stressors in the past two weeks as a result of COVID-19. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

279x215mm (300 x 300 DPI)

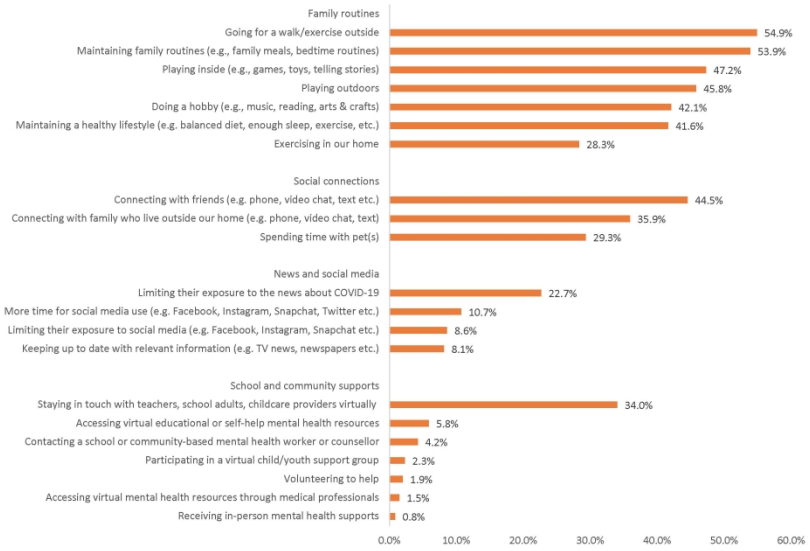

Figure 2. Parent-identified supports for addressing children's stress related to COVID-19 in the past two weeks. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

279x215mm (300 x 300 DPI)

Assessing the mental health impacts of COVID-19: A national survey study

The 2019 novel coronavirus (2019-nCoV), otherwise known as COVID-19, is an infectious disease that has resulted in a global pandemic. Throughout this questionnaire, we will refer to the disease as COVID-19.

For the following questions, we would like you to think about yourself, members of your household, or other family members who have been affected by the COVID-19 virus or response.

We have provided you with a "Prefer not to answer" option, which you can select if you do not wish to share your experiences on a particular question.

Employment Status Which of the following describes your current employment status since the outbreak of COVID-19? (Please select all that apply)

1. Working full time (30 or more hours per week)
2. Working part time (fewer than 30 hours per week)
3. Full time student (e.g. school, college, university, job training)
4. Part time student (e.g. school, college, university, job training)
5. Not working (e.g. parental leave, disability, medical leave, etc.)
6. Volunteer (unpaid)
7. Retired
8. Unemployed
9. Other
10. Prefer not to answer

[If currently working] Essential Service Workers The job that I am currently working in has been deemed as an essential service during the COVID-19 pandemic

1. Yes
2. No
3. Prefer not to answer

[If yes to essential service worker] please select the category that **BEST** describes your essential service role:

1. Health and health services
2. Law enforcement, public safety, first responder
3. Vulnerable population service provider (e.g., community outreach, childcare for essential service workers, substance use and addiction services)
4. Food and agriculture service provider (farming, food processing, grocery, hardware)
5. Transportation
6. Industry and manufacturing
7. Communications and information technology
8. Financial institutions
9. Other
10. Prefer not to answer

Mental Health Compared to before the COVID-19 pandemic and related restrictions in Canada, how would you say your mental health is **now**?

1. Significantly better now
2. Slightly better now
3. About the same
4. Slightly worse now
5. Significantly worse now
6. Prefer not to answer

COVID-19 Disease Which of the following applies to how you have been affected by COVID-19 at any point during the pandemic? (Please select all that apply)

1. I have been tested for COVID-19 and had a positive result
2. I have been tested for COVID-19 and had a negative result
3. Someone in my household has tested positive for COVID-19
4. Someone in my household has tested negative for COVID-19
5. A family member/loved one living at a different address has tested positive for COVID-19
6. I have self-isolated with symptoms of COVID-19
7. My household has self-isolated because someone else had symptoms of COVID-19
8. My household has self-isolated due to contact with someone else who had symptoms of COVID-19
9. My household has self-isolated due to recent travel
10. A family member/loved one living at a different address has self-isolated with symptoms of COVID-19
11. As part of my work I have worked directly with individuals who have tested positive for COVID-19
12. I have been hospitalized due to COVID-19
13. Someone in my household has been hospitalized due to COVID-19
14. A family member/loved one living at a different address has been hospitalized due to COVID-19
15. A family member/loved one is living at a long-term care facility that had cases of COVID-19
16. Someone in my household has died due to COVID-19
17. A family member/loved one living at a different address has died due to COVID-19
18. None of these
19. Don’t know
20. Prefer not to answer

Emotional Response Which of the following emotions have you felt as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Afraid
2. Panicked
3. Anxious or worried
4. Empathetic
5. Indifferent
6. Hopeful
7. Hopeless
8. Ashamed
9. Guilty
10. Lonely
11. Unprepared
12. Fearful
13. Sad
14. Grieving
15. Isolated
16. Angry
17. Stressed
18. Irritable
19. Bored
20. Inspired
21. Depressed
22. Uncertain
23. None of these
24. Don't know
25. Prefer not to answer

Stressors Have you been stressed or worried about any of the following as a result of the COVID-19 pandemic **in the past 2 weeks**? (Please select one option on each row)

1. Financial concerns (e.g. going into debt, ability to pay bills, long-term economic impacts, etc.)
2. Being unable to access benefit payments or not being eligible
3. Losing my job / loss of my job
4. Being able to cope with uncertainty (e.g. not knowing what will happen)
5. Becoming ill with the virus
6. Having no-one to care for me, as a result of becoming ill with the virus
7. Not being able to care for friends and family as a result of becoming ill
8. Not being able to care for friends and family due to physical distancing
9. Passing COVID-19 on to someone else if I became infected
10. Experiencing discrimination if I contract COVID-19
11. Being vulnerable because of an existing medical condition, age, etc.

12. Being separated from friends and family
13. Being able to cope with physical/social distancing (including concerns when needing to leave my residence for groceries, exercise, health care, etc.)
14. Having enough food to meet my household's basic needs
15. My education or career training has been or will be interrupted
16. Looking after my children while continuing to work
17. Making my existing mental health problems worse
18. Worrying about how the mental health of my child(ren) will be affected by the pandemic
19. Worrying about my children's education
20. Experiencing relationship challenges with my partner
21. Being safe from physical or emotional domestic violence
22. Fear of getting severely sick or dying
23. Fear of a family member/loved one getting severely sick or dying

1. Yes
2. No
3. Don't know
4. Not applicable
5. Prefer not to say

Food Security Since the onset of the COVID-19 pandemic and related restrictions in Canada, have you or any members of your household accessed food-based community programs to get food? (please select all that apply)

1. Food Bank
2. Soup Kitchens/Free Meal programs
3. Meal or food programs from a school
4. Community Kitchen program
5. Community Garden
6. Food voucher program (e.g., receiving gift cards for food from a charitable organization)
7. Food delivered by a community program
8. Other
9. No – I haven't accessed any food programs

Stress Overall, how well do you think you are coping with stress related to COVID-19 pandemic?

1. Very well
2. Fairly well
3. Not very well
4. Not well at all
5. Don't know
6. Prefer not to say
7. Not applicable – I have not experienced any stress related to COVID-19

Coping Which of the following have helped you to cope with stress related to the COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Connecting with those in my household
2. Connecting with my family or friends (e.g. phone, video chat, etc.)
3. Connecting with a mental health worker or counsellor **virtually** (e.g. via phone, video chat, etc.)
4. Having a supportive employer
5. Spending time with my pet(s)
6. Receiving **in-person** mental health supports
7. Accessing virtual mental health resources (e.g. online cognitive behavioural therapy, etc.)
8. Maintaining a healthy lifestyle (e.g. balanced diet, enough sleep, exercise, etc.)
9. Keeping up to date with relevant information (e.g. TV news, newspapers, online information, etc.)
10. Limiting my exposure to the news about COVID-19
11. Limiting exposure to social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
12. Increasing my use of social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
13. Contacting a support group (i.e., where members with the same issues can come together for sharing coping strategies, to feel more empowered and/or for a sense of community)
14. Going for a walk/exercise outside
15. Exercising in my home
16. Doing a hobby
17. Learning or doing something new
18. Volunteering to help
19. Accessing federal government benefits and supports (e.g., Canada Emergency Response Benefit, Canada Emergency Wage Subsidy, Canada Emergency Student Benefit, etc.)
20. Accessing provincial government supports (e.g., emergency benefits for workers)
21. Other [open] please specify _____
22. Don't know
23. Nothing has helped me to cope with my stress related to COVID-19
24. Not applicable – I don't feel stressed

Coping2 Please indicate how your use of any of the following has been impacted by the COVID-19 pandemic? (Please select one option on each row)

1. Consumption of alcohol
2. Use of tobacco products (e.g. cigarettes, cigars, chewing tobacco, vaping, etc.)
3. Use of cannabis products
4. Use of prescribed medication
5. Use of other psychoactive substances (e.g., cocaine, heroin)
6. Gambling
7. Eating too much
8. Eating too little
9. Screen time

1. More
2. Less
3. No change
4. Not applicable
5. Prefer not to say

The following questions are on the topic of self-harm and suicidal thoughts. We understand this can be a sensitive topic, so please remember that your answers are anonymous. If you are in crisis, please call 1-833-456-4566 toll free (In QC: 1-866-277-3553), 24/7 or visit www.crisisservicescanada.ca

Self-harm1 Have you done or experienced any of the following, as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select one option on each row)

1. Experienced suicidal thoughts/feelings
2. Deliberately hurt myself
3. Worried about someone close to me experiencing suicidal thoughts/feelings or deliberately hurting themselves

    1. Yes
    2. No
    3. Prefer not to say

    [if yes to above] Self-harm2 How often have you done each of the following as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select one option on each row)

    1. Experienced suicidal thoughts/feelings
    2. Deliberately hurt myself
    3. Worried about someone close to me experiencing suicidal thoughts/feelings or deliberately hurting themselves

        1. Once a day or more often
        2. Nearly everyday day
        3. A few times a week
        4. Passing thoughts
        5. Don't know
        6. Prefer not to say

Mental Health Support (Open-ended) If you could offer advice to others about how to support mental wellbeing during the COVID-19 pandemic, what would it be?

_____

Demographics

Gender identity Which gender do you most identify with?

1. Man
2. Woman
3. Transgender woman/trans woman
4. Transgender man/trans man
5. Non-binary
6. Two-Spirit
7. Not listed
8. Prefer not to answer

Ethnicity What is your family ethnicity? (Check all that apply)

1. Indigenous origins (for example, First Nations, Inuit, Métis)
2. East Asian origins (for example, Chinese, Japanese, Korean)
3. South Asian origins (for example, Indian, Punjabi, Pakistani)
4. Southeast Asian origins (for example, Filipino, Thai, Vietnamese)
5. Latin American origins (for example, Brazilian, Cuban, Bolivian)
6. European origins (for example, British, German, Russian)
7. Middle Eastern origins (for example, Iranian, Iraqi, Afghan)
8. African origins (for example, Nigerian, Ghanaian, Zimbabwean)
9. Other (please specify) _____
10. Don't know
11. Prefer not to answer

Sexuality Do you identify as being LGBT2Q+ (lesbian, gay, bisexual, trans, two-spirit, queer, etc.)?

1. Yes
2. No
3. Unsure
4. Prefer not to answer

Disability Do you identify as a person with a disability?

1. Yes
2. No
3. Prefer not to answer

Mental health Do you identify as a person who has a pre-existing (prior to COVID-19) mental health condition?

1. Yes
2. No
3. Prefer not to answer

Citizenship Which of the following best describes your Canadian citizenship status?

1. Canadian citizen by birth
2. Canadian citizen by naturalization
3. Landed immigrant/Permanent resident
4. Refugee
5. Not a citizen

Parent/Guardian status Which of the following best describes your parental/guardian status? (Please select all that apply)

1. Not a parent / guardian
2. Parent / guardian (any age)

    [If yes to parent/guardian] Children in household How many children (under 18 years of age) reside in your household?

        1. 0
        2. 1
        3. 2
        4. 3+

    [If yes to parent/guardian] Child's Age What age group is/are your child/children? (Please select all that apply)

        1. 4 years and under
        2. 5-11 years
        3. 12-17 years
        4. 18 years and over

[if yes to parent/guardian] Child Mental Health Compared to before the COVID-19 pandemic and related restrictions in Canada, how would you say the mental health of your child/children is now?

1. Significantly better now
2. Slightly better now
3. About the same
4. Slightly worse now
5. Significantly worse now
6. It is affecting my children differently (some feel better/some feel worse)
7. Prefer not to answer

[if yes to parent/guardian] Child Coping Strategies Which do you think have helped **your child(ren)** cope with stress related to COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Connecting with family who live outside our home (e.g. phone, video chat, text etc.)
2. Connecting with friends (e.g. phone, video chat, text etc.)
3. Contacting a **school or community-based** mental health worker or counsellor **virtually** (e.g. via phone, video chat, etc.)
4. Receiving **in-person** mental health supports
5. Staying in touch with teachers, school adults, childcare providers **virtually** (e.g. phone, video chat, text etc.)
6. Accessing virtual mental health resources through medical professionals (e.g. online cognitive behavioural therapy, etc.)
7. Accessing virtual educational or self-help mental health resources through websites, apps, or phone (e.g., Headspace, KidsHelpPhone)
8. Participating in a child/youth support group
9. Maintaining a healthy lifestyle (e.g. balanced diet, enough sleep, exercise, etc.)
10. Maintaining family routines (e.g., family meals, bedtime routines)
11. Keeping up to date with relevant information (e.g. TV news, newspapers, online information, etc.)
12. Limiting their exposure to the news about COVID-19
13. Limiting their exposure to social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
14. More time for social media use (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
15. Going for a walk/exercise outside
16. Exercising in our home
17. Spending time with pet(s)
18. Playing outdoors

19. Playing inside (e.g., games, toys, telling stories)
20. Doing a hobby (e.g., music, reading, arts & crafts)
21. Volunteering to help
22. Other [open] please specify

_____

23. Don't know
24. Not applicable
25. Nothing has helped my child(ren) to cope with stress related to COVID-19

[if yes to parent/guardian] Parent-Child Interactions Please indicate how each of the following have been impacted by the COVID-19 pandemic. (Please select one option on each row)

1. Having quality time with my child(ren)
2. Feeling closeness with my child(ren)
3. Showing love or affection to my child(ren)
4. Observing resilience (strength and perseverance) in my child(ren)
5. Disciplining my child(ren)
6. Conflicts with my child(ren)
7. Using harsh words with my child(ren)
8. Yelling/shouting at my child(ren)
9. Spanking or hitting my child(ren)

1. More
2. Less
3. No change
4. Not applicable
5. Prefer not to say

Household living Which of the following best describes your living arrangements? (Please select all that apply)

1. I live alone
2. Living with a spouse or partner
3. Living with friend(s) or housemate(s)
4. Living with siblings
5. Living with my child(ren) who are over 18
6. Living with my child(ren) who are under 18
7. Living with other adult family members (e.g., parents, grandparents)
8. Living with grandchildren
9. Other
10. Prefer not to answer
11. None of the above

Age demographics Which age category do you belong to?

1. 18-24 years
2. 25-34 years
3. 35-44 years
4. 45-54 years
5. 55-64 years
6. 65-74 years
7. 75 +

Geographic region In which province or territory of Canada do you live?

1. Alberta
2. British Columbia
3. Manitoba
4. New Brunswick
5. Newfoundland and Labrador
6. Northwest Territories
7. Nova Scotia
8. Nunavut
9. Ontario
10. Prince Edward Island
11. Quebec
12. Saskatchewan
13. Yukon

Rural Urban Do you live in a rural or urban area?

1. Rural
2. Urban

Education Which of the following best describes your highest education level?

1. Less than high school completion
2. High school completion (or equivalent)
3. Some post-secondary education
4. Post-secondary certificate or diploma
5. Undergraduate degree
6. Graduate or professional degree
7. Other _____
8. Prefer not to answer

Marital Status Which of the following best describes your current marital status?

1. Single (never been married)
2. Married or in a domestic partnership
3. Divorced/Separated
4. Widowed
5. Other (please specify) _____
6. Prefer not to answer

Income Which of the following is the best estimate of your overall household income last year before taxes?

1. Under $20,000
2. $20,000 to $49,999
3. $50,000 to $74,999
4. $75,000 to $99,999
5. $100,000 to $149,999
6. $150,000 to $199,999
7. $200,000 or more
8. Prefer not to answer

Thank you for taking part in this survey. If you've been affected by this topic and would like any more information, need advice, or support, you can go to the following place for help:
Canadian Mental Health Association

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5 supplementary file
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5
		(b) Indicate number of participants with missing data for each variable of interest	NA

Outcome data	15*	Report numbers of outcome events or summary measures	5-7
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-7
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-9
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	9
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	9-10
Generalisability	21	Discuss the generalisability (external validity) of the study results	9-10
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Examining the impacts of the COVID-19 pandemic on family mental health in Canada: Findings from a national cross-sectional study

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Examining the impacts of the COVID-19 pandemic on family mental health in Canada: Findings from a national cross-sectional study

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Conflict of Interest Declaration: CGR reports receiving personal fees from the University of British Columbia during the conduct of this study. All other authors report no competing interests.

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Abstract

Objectives: In the first wave of the COVID-19 pandemic, social isolation, school/child care closures, and employment instability have created unprecedented conditions for families raising children at home. This study describes the mental health impacts of the COVID-19 pandemic on families with children in Canada.

Design, setting, participants: This descriptive study utilized a nationally representative, cross-sectional survey of adults living in Canada (N=3000) to examine the mental health impacts of the COVID-19 pandemic. Outcomes among parents with children <18 years old living at home (n=618) were compared to the rest of the sample. Data were collected via online survey between May 14-29, 2020.

Outcome measures: Participants reported on changes to their mental health since the onset of the pandemic and sources of stress, emotional responses, substance use patterns, and suicidality/self-harm. Additionally, parents identified changes in their interactions with their children, impacts on their children's mental health, and sources of support accessed.

Results: 44.3% of parents with children <18 years living at home reported worse mental health as result of the COVID-19 pandemic compared to 35.6% of respondents without children <18 living at home, χ^2 (1, *N*=3000) = 16.2, *p*<.001. More parents compared to the rest of the sample reported increased alcohol consumption (27.7% vs 16.1%, χ^2 (1, *N*=3000) = 43.8, *p*<.001), suicidal thoughts/feelings (8.3% vs 5.2%, χ^2 (1, *N*=3000) = 8.0, *p*=.005), and stress about being safe from physical/emotional domestic violence (11.5% vs 7.9%, χ^2 (1, *N*=3000) = 8.1, *p*=.005). 24.8% (95% CI 21.4-28.4) of parents reported their children's mental health had worsened since the pandemic. Parents also reported more frequent negative as well as positive interactions with their children due to the pandemic (e.g., more conflicts, 22.2% (95% CI 19.0-25.7); increased feelings of closeness, 49.7% (95% CI 45.7-53.7)).

Conclusions: This study identifies that families with children <18 at home have experienced deteriorated mental health due to the pandemic. Population-level responses are required to adequately respond to families' diverse needs and mitigate the potential for widening health and social inequities for parents and children.

Article Summary

Strengths and limitations of the study

- Survey items were informed by a longitudinal COVID-19 mental health survey, first commissioned by the UK Mental Health Foundation and developed in consultation with people with lived experience of mental health conditions; Adaptations were made for the Canadian context and to support analyses focused on issues of equity.
- The large sample size enabled subgroup analyses in mental health according to gender, age, pre-existing mental health conditions, disabilities, and household demographics.
- Targeted sampling ensured participation from families of diverse backgrounds.
- Cross-sectional observational design and lack of adjustment for potential confounding prohibits causal inference.

Keywords: Mental health, Public health, Community child health, Epidemiology, COVID-19

Introduction

The COVID-19 pandemic has led to unprecedented global morbidity and mortality, with population mental health impacts recognized as a growing concern (1), and particular risks identified within the family context (2–4). Specifically, the COVID-19 pandemic has posed new threats to families through social isolation due to physical distancing measures, school/child care closures, financial and employment insecurity, housing instability, and changes to health and social care access (3–5). These shifts have profoundly interrupted the systems and structures that previously operated to both support the mental health and wellbeing of families and mitigate the risks that contribute to health and social inequities.

During the pandemic, many parents have experienced increased pressures and erosions to social supports, with implications for their mental health. In a US survey, the majority of parents expressed that during the pandemic, concerns about finances, social isolation, criticism from others, as well as emotional experiences of sadness and loneliness were affecting their parenting (6). Globally, school and child care closures and the hiatus of after-school activities has added to parental pressure to balance responsibilities, including becoming the sole providers of supervision and education for their children – all while experiencing heightened financial and emotional stress (7). Families, generally, are affected by the disruptions of the pandemic. However, these pressures disproportionately affect families who experience health and social inequities, including fewer financial and social resources, crowded homes, and limited technology and internet access (7–9). The collision of these stressors has contributed to increases in domestic violence (10,11), and emerging studies have shown increased frequency of shouting and physical punishment of children since the pandemic began (6).

In Canada, federal and provincial governments began implementing lockdown measures mid-March 2020 including border closures and restricted travel, restrictions on group gatherings, school/child care closures, mandatory working from home, and temporary suspension of non-essential health and public services (12). National COVID-19 incidence rates first peaked in April 2020 with nearly 3,000 new cases confirmed daily (13). By early May 2020, incidence rates were decreasing and provinces began easing lockdown measures including re-opening businesses and encouraging rehiring of employees (12). However, there were indications that the pandemic was already impacting the mental health and wellbeing of Canadian children.[1] For example, by April 2020, reports showed a dramatic surge in calls documented by Kids Help Phone, a national helpline for young people, with a 48% increase in calls about social isolation, a 42% increase in calls about anxiety and stress, and a 28% increase in calls about physical abuse (14). Experts raised alarms that disruptions to routines and services, combined with increased family stressors, social isolation, and domestic violence, were creating conditions that risked increasing child mental health problems on an unprecedented scale, with children from marginalized and socioeconomically disadvantaged backgrounds likely to be disproportionately affected (15,16). Thus, while young people initially appear to be less susceptible to the physical effects of the virus, they are experiencing significant challenges, likely resulting from the social and economic impacts of the pandemic within their family contexts (4,17). This is particularly concerning as research consistently demonstrates that children's early exposures to stress can have lasting effects (18–21).

Families and children are furthermore supported by a social ecological system that has been forced to adapt quickly to support families' needs, often with limited information or evaluation. School and child care closures due to the pandemic are concerning not only for the disruption to typical classroom

[1] For the context of this study, children are defined as children and youth below the age of 18.

learning, but also for the loss of systems-level safeguards such as nutrition programs, after-school care, school health and counseling services, and vaccination clinics (22,23) that seek to mitigate some consequences of health and social inequities among structurally vulnerable children and families. And yet, even as schools and workplaces started to re-open, concerns were raised about the health risks of returning to populated spaces (including public transit) disproportionally affecting families with lower incomes, fewer resources, and with limited options for returning to work (24). Furthermore, families, child care settings, and schools are nested within health authorities and government structures that determine many of the policies, services, and financial and employment supports available to parents as well as the availability of these supports beyond the pandemic.

This paper presents findings on the impact of the COVID-19 pandemic on families from the first wave of a nationally representative cross-sectional survey monitoring the mental health of people living in Canada. The study aimed to answer three questions: a) How is the COVID-19 pandemic affecting the mental health of parents and children and what subpopulations or subgroups are most impacted by the pandemic? b) How have parent-child interactions changed due to the pandemic? and c) What are the factors that support mental health in the family context? The findings provide critical evidence to inform rapid, data-driven public health responses to meet the mental health needs of families and children in the context of the COVID-19 pandemic and beyond.

Methods

Survey development and approach

This investigation focuses on data from the initial wave of our cross-sectional survey, *"Assessing the Impacts of COVID-19 on Mental Health."* The study represents a unique collaboration between academic researchers from the University of British Columbia, the Canadian Mental Health Association (Canada), and by an international research partnership with the Mental Health Foundation (UK).

Patient and public involvement

Survey items were informed by a longitudinal survey first commissioned by the Mental Health Foundation in March 2020 and developed in consultation with people with lived experience of mental health conditions via a citizen's jury participatory methodology process. The citizen's jury was a collaborative process that engaged people with diverse experiences and backgrounds in the development and interpretation of the research to enhance its relevance and impact, including insights on stressors, coping strategies, and mental health (25,26). Items on family mental health were adapted from previously developed community survey items related to the COVID-19 pandemic from the University of Michigan (6). Modifications were made by the research team in consultation with collaborators from the Canadian Mental Health Association to reflect the Canadian context, aimed at examining indicators of mental health, stress, and coping related to the COVID-19 pandemic among the Canadian population. Modifications included adding items on the impacts on young people's mental health, potential sources of support, family dynamics, financial interventions introduced by the Government of Canada in response to the pandemic (e.g., Canada Emergency Response Benefit), and food security systems. Survey items are provided in Additional File 1.

Procedure

Data were collected between May 14-29, 2020, via a rapid online survey distributed by polling vendor Maru/Matchbox. Maru/Matchbox maintains the Maru Voice Canada panel consisting of approximately 125,000 adults. Panel participants were recruited through direct email, with targeted sampling through affiliate community partners to increase inclusion of populations that may be difficult to reach via the internet (e.g., older adults, people of ethnic minority) (27). Surveys were distributed to 3558 panel members to reach a total of 3,000 respondents, yielding an invitation-to-response rate of 84%. Members of the panel were randomly invited by Maru/Matchbox to participate in the survey using Canadian national census informed stratifications defined by sociodemographic characteristics (age, gender, household income and region) with adjustments for response propensity to generate a representative sample by age, gender, income, and region (27). The data collection period captured the first phases of "re-opening" across many Canadian provinces and territories, emerging from approximately two months of mandated physical distancing, school/child care and work closures, and related disruptions.

All participants completed an online consent process prior to beginning the survey and were provided with a small honorarium through Maru/Matchbox to compensate for their time. Ethics approval was provided by the Behavioural Research Ethics Board at the University of British Columbia (H20-01273).

Measures and analyses

This investigation focuses on a subsample of participants who identified as parents with children <18 years old currently living at home (n=618). Changes in mental health due to the pandemic were compared between this parent subsample and the rest of the sample (i.e., respondents who were not parents with children <18 living at home). Comparisons were also conducted within the subsample of parents. Participants completed sociodemographic questions as well as questions about their mental health, emotional responses to the pandemic, changes in substance use, experiences of suicidal thoughts, and self-harm. Parents also completed questions on changes to parent-child interactions, impacts of the pandemic on their children's mental health, and were asked to identify sources of stress and support for themselves and their children.

Descriptive and bivariate analyses (frequencies, chi square tests) were used to examine self-reported changes in mental health since the onset of the pandemic across groups defined by gender, age, disability, and pre-existing mental health conditions, as well as frequently identified stressors, supports, and changes in parent-child interactions. Data were analyzed using SPSS version 26 (28). The maximum margin of error for proportions derived from the parent subsample was +/- 3.9% at a 95% level of confidence. This was a complete case analysis. In chi squared analyses, "don't know," "not applicable," and "prefer not to answer" responses were treated as "not yes."

Results

Sample description

Of the 3,000 respondents, 618 identified as parents to a child <18 living at home.[2] The average age of the parent subsample was 43.0 years (SD=9.0 years) and 52.4% identified as women. Further sample characteristics are presented in Table 1.

- Insert Table 1 -

Pandemic-related changes in parent mental health

Parents identified more pandemic-related risks and vulnerabilities compared to respondents without children <18 years living at home across a number of mental health constructs. Since the onset of the COVID-19 pandemic, a significantly higher proportion of parents reported deteriorated mental health (44.3%) compared to 35.6% among their counterparts without children <18 years at home, χ^2 (1, N = 3000) = 16.2, p < .001. Changes to mental health furthermore varied across sociodemographic characteristics within the parent subsample. Table 2 presents the proportions of parents reporting deteriorated mental health since the pandemic according to parent gender, age, pre-existing mental health conditions, disabilities, child age, and employment and financial circumstances. Among parents with children at home, deteriorated mental health was significantly more prevalent among women, parents under age 35, parents with a pre-existing mental health condition, parents with a disability, parents of younger children (≤ 4 years), and parents reporting financial stress. When asked about their emotions in the past two weeks as a result of the COVID-19 pandemic, the most frequent response from parents was anxious and worried (51.9%; 95% CI 47.9-55.9), followed by stressed (46.1%; 95% CI 42.1-50.1), and bored (39.5%; 95% CI 35.6-43.5).

- Insert Table 2 -

Overall, 8.3% of parents reported experiencing suicidal thoughts/feelings as a result of the COVID-19 pandemic in the past two weeks compared to 5.2% among their counterparts without children at home, χ^2 (1, N = 3000) = 8.0, p = .005. Furthermore, 2.6% of parents reported deliberately hurting themselves as a result of the pandemic in the past two weeks compared to 1.3% among their counterparts, χ^2 (1, N = 3000) = 4.8, p = .028.

As a means of coping with deteriorations in mental health and stressors of the pandemic, many parents identified an increase in alcohol use. Specifically, 27.7% of parents reported increased alcohol consumption compared to 16.1% among those without children at home, χ^2 (1, N = 3000) = 43.8, p < .001. Within the parent subsample, increased alcohol consumption was more prevalent among men (32.3%) compared to women (23.5%), χ^2 (1, N = 618) = 6.0, p = .014.

[2] In the following when we refer to parents, these are parents living with children <18 years old unless otherwise specified.

Pandemic-related stressors

As shown in Figure 1, when asked about stressors and worries resulting from the COVID-19 pandemic in the past two weeks, parents most frequently reported mental health impacts, physical health threats related to the pandemic, and relational and financial concerns. Being able to cope with uncertainty (59.2%; 95% CI 55.2-63.1), fear of a family member getting sick or dying (58.9%; 95% CI 54.9-62.8), and being separated from friends and family (58.7%; 95% CI 54.7-62.7) were the most frequent responses. A large proportion also reported being stressed about financial concerns (45.6%; 95% CI 41.2-49.7), losing/loss of job (31.4%; 95% CI 27.8-35.2), and having enough food to meet their household's basic needs (20.4%; 95% CI 17.3-23.8). Further, 36.9% (95% CI 33.1-40.8) of parents reported being stressed about looking after children while continuing to work and 27.8% (95% CI 24.3-31.6) were stressed that the pandemic would make their existing mental health problems worse.

Relationship challenges were also a prominent concern among parents. For example, 28.3% (95% CI 24.8-32.1) of parents reported being stressed about experiencing relationship challenges with their partner and 11.5% (95% CI 9.1-14.3) reported being stressed about being safe from physical or emotional domestic violence during the two weeks prior. This proportion identifying concern about being safe from domestic violence was significantly higher among parents compared to the rest of the sample (7.9%), χ^2 (1, N = 3000) = 8.1, p =.005. Within the parent subsample, a higher proportion of men (14.6%) reported being stressed about being safe from physical or emotional domestic violence compared to women (8.6%), χ^2 (1, N = 618) = 5.4, p =.020.

- Insert Figure 1-

Child mental health and parent-child interactions

The majority of parents (59.7%; 95% CI 55.7-63.6) reported their children's mental health had stayed the same since the onset of the COVID-19 pandemic; however, 24.8% (95% CI 21.4-28.4) indicated that their child or children's mental health had worsened.

Overall, due to the COVID-19 pandemic, parents reported more negative interactions with their children, including more conflicts (22.2%; 95% CI 19.0-25.7), yelling/shouting (16.7%; 95% CI 13.8-19.8), disciplining (16.0%; 95% CI 13.2-19.2), and using harsh words (10.7%; 95% CI 8.4-13.4). However, overall, parents also reported that they experienced increased positive interactions, including having more quality time (65.4%; 95% CI 61.5-69.1), feeling closeness (49.7%; 95% CI 45.7-53.7), showing love or affection to their children (44.5%; 95% CI 40.5-48.5), and observing increased resilience (strength and perseverance) in their children (38.2%; 95% CI 34.3-42.2). Parents often reported increases in both negative and positive interactions due to the COVID-19 pandemic. For example, a higher proportion of parents who reported more conflicts with children also reported increased feelings of closeness (59.1%) compared to parents who did not report more conflicts with children (47.0%), χ^2 (1, N = 618) = 6.3, p = .012.

Changes in parent-child interactions also varied according to salient sources of stress (i.e., financial concerns and the pandemic causing existing mental health problems to become worse). A higher proportion of parents reported increased harsh words with children when they were stressed about finances (13.8%) compared to parents who did not report this stressor (8.0%), χ^2 (1, N = 618) = 5.4, p =

.020. Parents who reported stress that the pandemic would make an existing mental health problem worse, compared to parents without this stressor, also more frequently reported increased harsh words with children since the pandemic (20.9% vs 6.7%), as well as increased discipline (23.8% vs 13.0%), conflicts (33.1% vs 17.9%), and yelling/shouting (31.4% vs 11.0%), χ^2 (1, N = 618) = 10.8-37.2, p's $\leq$ .001.

Interestingly, a higher proportion of parents stressed about financial concerns, compared to parents who did not report this stressor, also reported increased quality time with children (71.6% vs 60.1%), showing more love and affection to their children (49.3% vs 40.5%), and observing resilience in their children (43.3% vs 33.9%), χ^2 (1, N = 618) = 4.82-8.98, p's < .028. A higher proportion of parents stressed about an existing mental health problem also reported showing more love and affection to children as a result of the pandemic (53.5%) compared to parents without this stressor (41.0%), χ^2 (1, N = 618) = 7.8, p < .005.

Sources of support

Figure 2 presents sources of support identified by parents that had helped them cope with stress related to the COVID-19 pandemic in the past two weeks. Parents most frequently identified going for a walk/exercise (59.1%; 95% CI 55.1-63.0), connecting with family and friends via phone and video chat (50.5%; 95% CI 46.5-54.5), connecting with those in their household (47.6%; 95% CI 43.6-51.6) and maintaining a healthy lifestyle (37.9%; 95% CI 34.0-41.8) as strategies that had helped them.

Figure 3 presents sources of support identified by parents that had helped their children cope with stress related to the pandemic in the past two weeks. Parents most frequently identified these same strategies, as well as maintaining family routines (53.9%; 95% CI 49.9-57.9), playing inside (47.2%; 95% CI 43.2-51.3) and playing outdoors (45.8%; 95% CI 41.8-49.8) as having helped their children. Furthermore, 34.0% (95% CI 30.3-37.9) of parents identified staying in touch with teachers, school adults, and child care workers as a source of support during the pandemic, and 5.8% (95% CI 4.1-8.0) identified accessing virtual educational or self-help mental health resources (e.g., websites, apps) as a strategy that had helped their children. Additionally, 4.2% (95% CI 2.8-6.1) of parents had contacted a school or community-based mental health worker or counsellor virtually (e.g., via phone or video chat).

Regarding structural supports, a significantly higher proportion of parents (23.3%) identified having a supportive employer as a factor that helped their stress related to the pandemic in the past two weeks, compared to respondents without children at home (14.1%), χ^2 (1, N = 3000) = 30.9, p < .001. Although overall access of structural supports was low, a significantly higher proportion of parents reported accessing federal financial benefits to help cope with stress in the past two weeks (13.6%) compared to the rest of the sample (9.2%), χ^2 (1, N = 3000) = 10.2, p = .001. When restricted to parents stressed about financial concerns due to the COVID-19 pandemic (n=282), this proportion increased to 19.1% (95% CI 14.7-24.2). Finally, a significantly higher proportion of parents (7.9%) reported that they or a member of their household had accessed a food-based community program since the onset of the pandemic such as the Food Bank, free meal programs, community kitchens, or food vouchers from a charity, compared to the rest of the sample (4.4%), χ^2 (1, N = 3000) = 12.5, p < .001. When restricted to parents stressed about having enough food to meet household needs due to the COVID-19 pandemic (n=126), this proportion increased to 17.5% (95% CI 11.3-25.2).

- Insert Figure 2 –

- Insert Figure 3 -

Discussion

This study identifies that following the first lockdown phase in Canada, 44.3% of parents of children <18 living at home reported worse mental health as a result of the pandemic. This aligns with research in the United States identifying similar deteriorations in family mental health due to the COVID-19 pandemic (29). International studies among the general population throughout the first five months of the pandemic estimated prevalence rates of up to 51% for anxiety symptoms, up to 48% for depressive symptoms, and up to 54% for symptoms of psychological distress (29). Within parts of Canada during the same period, the prevalence of depressive symptoms in the general population had more than doubled compared to previous national estimates (30), with experts projecting national increases in suicide based on trends in unemployment (31). To our knowledge, the current study is the first national Canadian survey to identify that parents of children <18 living at home are a group at disproportionate risk due to the COVID-19 pandemic. Compared to the rest of the population, a larger proportion of parents with children <18 at home reported increased alcohol consumption as a result of the pandemic, and suicidal thoughts or feelings, self-harm, and stress about being safe from physical or emotional domestic violence in the past two weeks. These data validate early public health concerns regarding these mental health consequences of the pandemic (2,10,32). Within our parent subsample, women, younger parents, parents of small children, those living with a disability and those with a pre-existing mental health condition reported worsened mental health since the start of the pandemic compared to other parents.

Within the subsample of parents with children living at home, more men reported increased alcohol use and being stressed about domestic violence compared to women. This gender difference in alcohol use aligns with pre-pandemic research findings that men generally consume more alcohol than women and are more likely than women to externalize distress through increased alcohol consumption (33,34). However, the finding that men reported greater worry and stress from domestic violence than women is contrary to pre-pandemic studies showing that women are disproportionately affected by domestic violence (35,36). Our survey question specifically asked about stress/worries about being safe from physical or emotional domestic violence as a result of the COVID-19 pandemic, which may not be comparable to the examination of this experience in other studies. This necessitates further research to unpack this association in the context of social isolation, financial stress, and parenting responsibilities.

Parents with children <18 at home reported unique pressures, including worrying about their children's health, mental health, education, and being stressed about looking after children while continuing to work. A high proportion of parents reported being stressed about financial concerns (45.6%), about the pandemic making their existing mental health problems worse (27.8%), and about having enough food to meet their household's basic needs (20.4%). A larger proportion of parents indicating stress about financial concerns or worsening of existing mental health problems due to the pandemic reported negative interactions with their children, including increased conflicts, discipline, use of harsh words, and yelling/shouting compared to parents without these stressors. This aligns with other research showing that children have been relatively overlooked as a population vulnerable to the impacts of the COVID-19 virus, but are particularly vulnerable to stressful conditions exacerbated by the pandemic

including financial stress, food insecurity, domestic violence, and disrupted systems of care and education (37,38).

However, the majority of parents also reported increased positive interactions at home, including having more quality time together, feeling closeness, showing love and affection, and observing resilience in their children. Parents often reported increases in both negative and positive interactions with children due to the COVID-19 pandemic, possibly due to increased opportunities for family interactions overall. Furthermore, a larger proportion of parents stressed about financial concerns due to the pandemic reported having more quality time, showing more love and affection, and observing resilience in their children. A larger proportion of parents stressed about worsening mental health problems reported showing more love and affection with their children. Increased time and flexibility at home has created conditions for families to engage in more conversations and activities together (39,40). Previous research has found that while parenting pressures during the pandemic have increased, so have opportunities to strengthen family connectedness (7). Our results indicate that strengthened connectedness may be particularly salient for families experiencing heightened stress due to the pandemic, although the specific mechanisms underlying these associations are unclear.

Free digital technologies have furthermore facilitated connecting with others outside the home, as well as tools for managing parenting stress and enabling children to participate in school and child-friendly activities online (7,8,40). However, digital technologies and online learning are not easily accessible for everyone, particularly for families with limited internet or digital device access and language barriers, and for children with learning difficulties and special needs. In the current study, fewer than 6% of families reported accessing virtual mental health supports as strategies for addressing children's stress related to the pandemic. Although online mental health services have been found to be effective, feasible, and acceptable among adults and youth (41), real-world uptake and retention has generally been found to be low (42,43). Early COVID-specific research from China has found that uptake of any mental health services since the start of the pandemic has been as low as 3.7%, with concerns raised that online mental health services may still not address present needs due to existing digital divides, appropriateness for all populations, and quality assurance (44).

Considering the needs of diverse families, as well as issues of health equity, early examinations of the COVID-19 pandemic have also emphasized the importance of community organizations and governments in providing access to economic and social supports (45,46). In the current study, a significantly greater proportion of parents with children < 18 living at home compared to the rest of the population had relied on supportive employers and government financial supports in the past two weeks, and had accessed food programs since the start of the pandemic. Parents also frequently identified school, community, and government supports that had helped them and their children cope with stress related to the COVID-19 pandemic. Other studies have also identified supports such as paid emergency leave, unemployment insurance, rent protection, and access to safe and secure housing and outdoor spaces as critical in supporting parents to have the time and resources necessary to care for their children (45,46). Although these policies and relief systems may not have been designed specifically for families and children, they hold the potential to address the underlying causes (47) of compromised parent and child mental health at the population level, including family financial stress, employment and food insecurity, stigma, overcrowding, and violence. The effectiveness of these policies, however, will depend on the human resources to organize, distribute, and implement services when workforces are already overloaded. For example, in the current study, fewer than one in five families with financial stress or concerns about having enough food to meet their household basic needs had recently accessed federal benefits or food programs, respectively, warranting further investigation

into the ease of access to these services (48). Furthermore, many of these underlying causes of health inequities will remain after the COVID-19 crisis has subsided (49), suggesting that many of these interventions should be sustained irrespective of the pandemic.

Strengths and Limitations

A notable strength of this study was the large, nationally representative sample that enabled population subgroup analyses to examine disparities in mental health for parents and across parent subgroups. The study was designed to include participation from families of diverse backgrounds, although small numbers of parents identifying as Indigenous or LGBT2Q+ prohibited us from examining these populations of interest. We also did not have a reliable measure of single parent status to investigate mental health trends among this group. Although strategies including oversampling and community partnerships were used to minimize selection bias and reduce possible technology barriers, it is possible that survey respondents differed from survey non-respondents on key measures of interest including mental health, financial security, or family conflict, which may have affected our estimates. The study design was cross-sectional, therefore we cannot determine if outcomes such as parent-child interactions and parent stressors were causally related, only that they were associated. We also did not control for potential confounding variables that might have introduced bias; further in-depth investigations would complement this study by providing more understanding of these associations. This study did not measure the prevalence of specific mental health outcomes or include clinical assessments of mental illness which may limit comparability with other research. This study also did not take into account baseline measures of mental health or multiple comorbidities and was specific to the Canadian context during the first re-opening phase of the COVID-19 pandemic. It will be important to monitor the impact of the pandemic on family mental health over time and in different contexts. We were also unable to assess the impact of the pandemic from the perspectives of children and youth themselves, including children's reactions to parents' stress during the pandemic and children's reported supports including use of mental health services. This is a critical knowledge gap for future research to address. The purpose of the current study was to assess preliminary impacts of the COVID-19 pandemic on families' general mental health at a community level and to provide early data to inform relevant policy and programming actions. Examining specific impacts on the prevalence of mental health disorders and effective clinical responses is an important focus for future research.

Conclusions and implications

In response to the COVID-19 pandemic, policymakers and service providers globally have been faced with the challenge of having to make rapid decisions that will have immediate and long-term effects on the mental health and well-being of families and children. In the early days of the first "re-opening" phase in Canada, nearly two in every five people reported worse mental health since the pandemic began, with this proportion increasing to nearly one in every two people for parents with children <18 living at home. Schools/child care, communities, and government systems play an essential role in protecting and supporting parents and children, particularly for families without reliable access to the internet or virtual technologies. While pressure is put on parents, it is important to remember that families exist within a social ecosystem with opportunities to promote child and youth mental health. Supports such as affordable child care, low barrier internet access, publicly-funded stepped care and psychotherapy, and easily available financial supports are interventions that can directly benefit families (40,50). Continuations of financial interventions beyond the pandemic have also been suggested, including the idea of a universal basic income (51). The effectiveness of these systems further depends

on intersectoral communication, collaboration, and action, and therefore seeking feedback and advice from community stakeholders will be critical for monitoring whether these systems are working for families and children during the remainder of the pandemic and beyond.

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Author statement (contributions)
AMG, KCT, MG, EJ, and CM co-led the conceptualization of this investigation. AMG directed the data analyses, interpretation and writing of this manuscript. KCT conducted the data analyses and contributed to data interpretation and writing of this manuscript. EJ, CGR, MG, CM, and SH contributed to the interpretation and writing of this manuscript.

Data statement
Data available upon reasonable request.

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Table 1. Sociodemographic characteristics of the parent subsample (n=618)

		Sample distribution	
		n	%
PARENT DEMOGRAPHICS			
Gender			
	Men	294	47.6%
	Women	324	52.4%
Age			
	18-34	130	21.1%
	35-44	214	34.6%
	45-54	235	38.0%
	55+	39	6.3%
Province of residence			
	Alberta	86	13.9%
	British Columbia/Territories	81	13.1%
	Manitoba/Saskatchewan	49	7.9%
	Ontario	243	39.3%
	Atlantic Provinces	43	7.0%
	Quebec	116	18.8%
Rural vs urban			
	Urban	531	85.9%
	Rural	87	14.1%
Education			
	High school or less	62	10.0%
	Some college/university	226	36.6%
	University+	330	53.4%
Marital status			
	Single, never married	39	6.3%
	Married or partnered	517	83.7%
	Separated, divorced, widowed	62	10.0%
Household Income			
	<$50K	108	17.5%
	$50K to <$100K	197	31.9%

	$100K+	313	50.6%
Employment status			
	Unemployed (due to COVID-19)	86	13.9%
	Unemployed (prior to COVID-19)	21	3.4%
Lesbian, Gay, Bisexual, Transgender, Two-Spirit, and Queer or Questioning			
	Yes	24	3.9%
Pre-existing mental health condition			
	Yes	111	18.0%
Disability			
	Yes	45	7.3%
Ethnicity			
	Indigenous origins (e.g., First Nations, Inuit, Métis)	17	2.8%
	Visible minority (e.g., Asian, Latin American, Middle Eastern, African)	122	19.7%
	European origins (e.g., British, German, Russian)	394	63.8%
Household Living			
	Living with a spouse or partner	500	80.9%
	Living with other adult family members (e.g., parents, grandparents)	26	4.2%
	Living with grandchildren	11	1.8%
CHILD DEMOGRAPHICS			
Child age (check all that apply)			
	4 years and under	183	29.6%
	5-11 years	292	47.2%
	12-17 years	309	50.0%
	18 years and over	70	11.3%
Child siblings at home			
	Yes	325	52.6%

Table 2. Changes in parent self-reported mental health since the onset of the COVID-19 pandemic

		GENDER		AGE		PRE-EXISTING MENTAL HEALTH CONDITION		DISABILITY		UNEMPLOYED DUE TO COVID-19		PARENT TO A CHILD <4 YEARS OLD		PARENT TO A CHILD 5-11 YEARS OLD		PARENT TO A CHILD 12-17 YEARS OLD		PARENT WITH MULTIPLE CHILDREN AT HOME		FINANCIAL CONCERNS	
	Total	Women	Men	<35 yrs	35+ yrs	Yes	Not yes	Yes	Not yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Not Yes
	(n=618)	(n=324)	(n=294)	(n=130)	(n=488)	(n=111)	(n=507)	(n=45)	(n=573)	(n=86)	(n=532)	(n=183)	(n=435)	(n=292)	(n=326)	(n=309)	(n=309)	(n=325)	(n=293)	(n=282)	(n=336)
Worse Mental Health	274	158	116	70	204	74	200	27	247	44	230	101	173	124	150	121	153	138	136	147	127
	44.3%	48.8%*	39.5%	53.8%*	41.8%	66.7%**	39.4%	60.0%*	43.1%	51.2%	43.2%	55.2%**	39.8%	42.5%	46.0%	39.2%*	49.5%	42.5%	46.4%	52.1%**	37.8%

*p<.05, **p<.001

Worse mental health combines slightly and significantly worse mental health. Differences in proportions within groups were tested with Chi-squared tests.
Due to small sample sizes, Indigenous origins and sexuality (Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning) are not reported.

Figure Captions

Figure 1. Parent stressors in the past two weeks as a result of the COVID-19 pandemic

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

Figure 2. Parent-identified supports for coping with stress related to the COVID-19 pandemic in the past two weeks

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

Figure 3. Parent-identified supports for helping their children cope with stress related to the COVID-19 pandemic in the past two weeks

Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

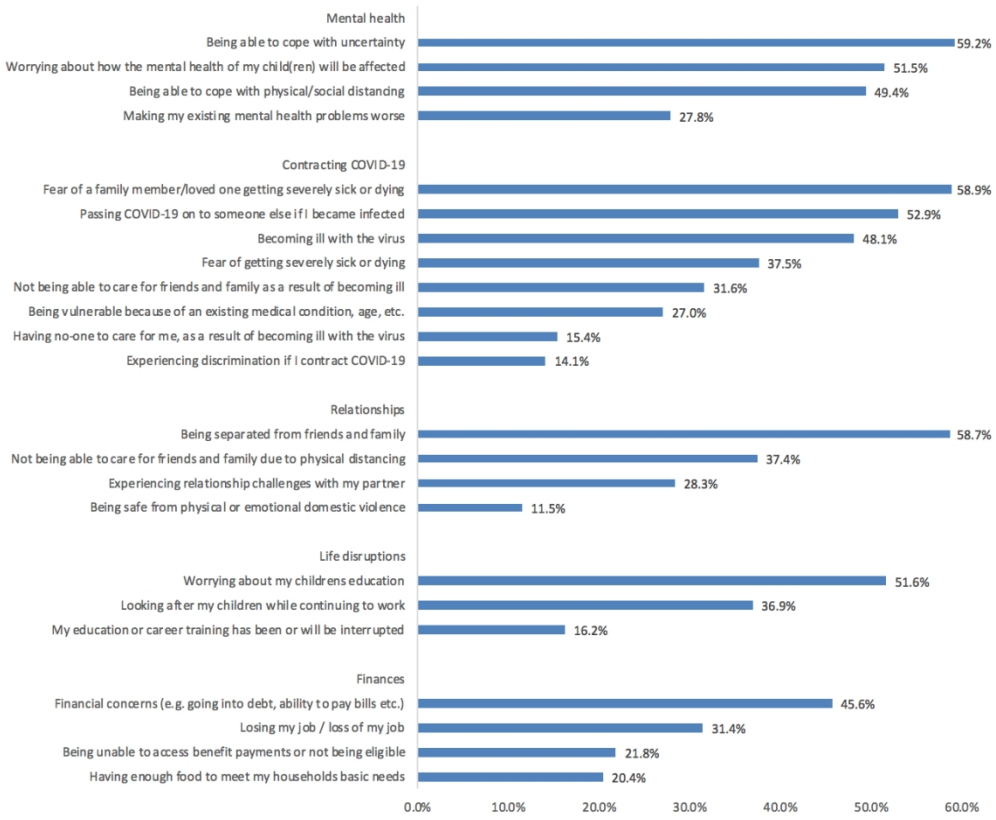

Figure 1. Parent stressors in the past two weeks as a result of the COVID-19 pandemic. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

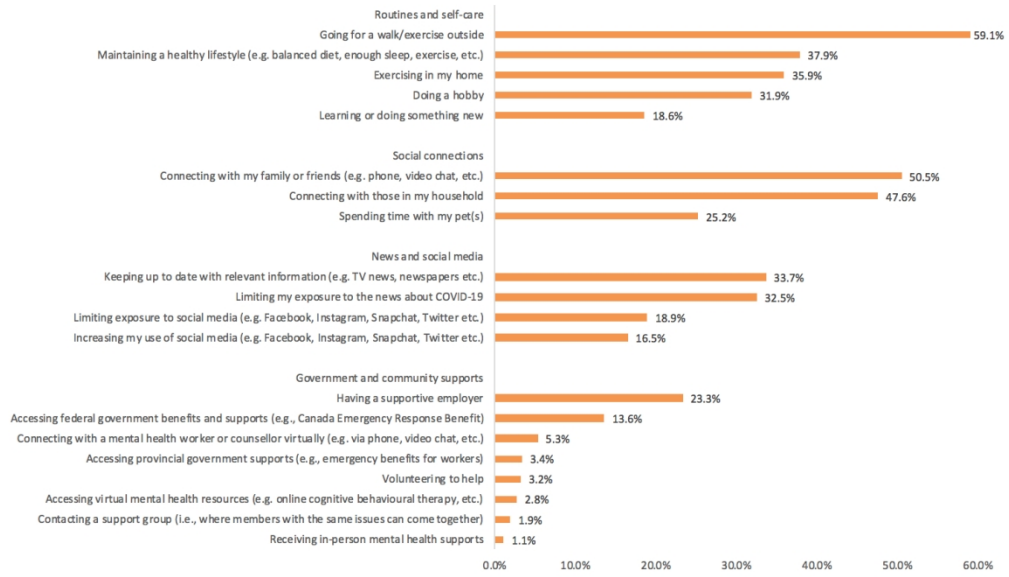

Figure 2. Parent-identified supports for coping with stress related to the COVID-19 pandemic in the past two weeks. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

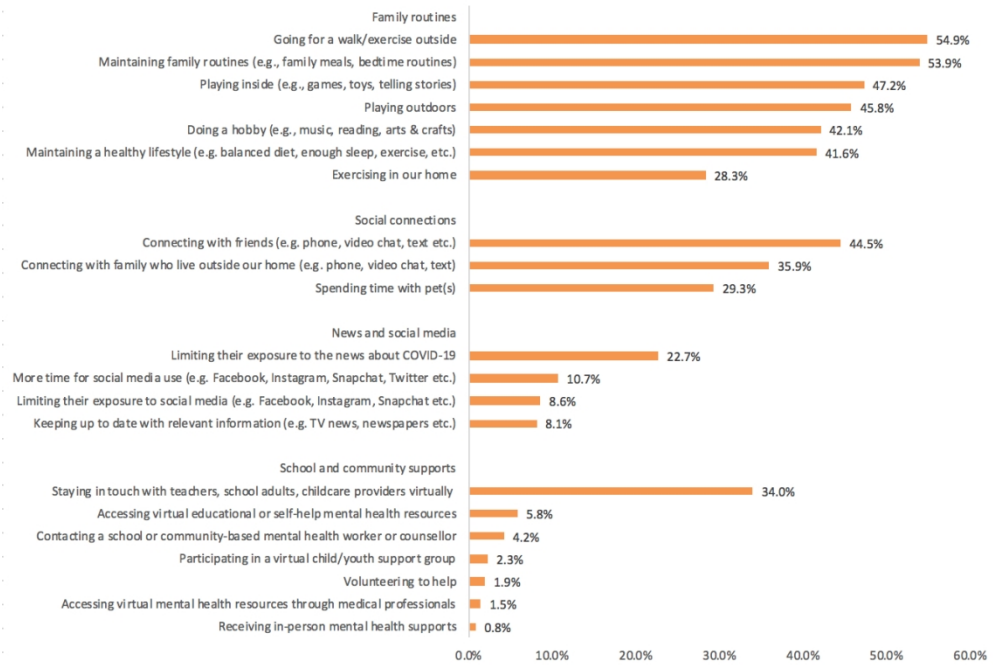

Figure 3. Parent-identified supports for helping their children cope with stress related to the COVID-19 pandemic in the past two weeks. Footnote: Maximum margin of error for proportions was +/- 3.9% at a 95% level of confidence.

Assessing the mental health impacts of COVID-19: A national survey study

The 2019 novel coronavirus (2019-nCoV), otherwise known as COVID-19, is an infectious disease that has resulted in a global pandemic. Throughout this questionnaire, we will refer to the disease as COVID-19.

For the following questions, we would like you to think about yourself, members of your household, or other family members who have been affected by the COVID-19 virus or response.

We have provided you with a "Prefer not to answer" option, which you can select if you do not wish to share your experiences on a particular question.

Employment Status Which of the following describes your current employment status since the outbreak of COVID-19? (Please select all that apply)

1. Working full time (30 or more hours per week)
2. Working part time (fewer than 30 hours per week)
3. Full time student (e.g. school, college, university, job training)
4. Part time student (e.g. school, college, university, job training)
5. Not working (e.g. parental leave, disability, medical leave, etc.)
6. Volunteer (unpaid)
7. Retired
8. Unemployed
9. Other
10. Prefer not to answer

[If currently working] Essential Service Workers The job that I am currently working in has been deemed as an essential service during the COVID-19 pandemic

1. Yes
2. No
3. Prefer not to answer

[If yes to essential service worker] please select the category that **BEST** describes your essential service role:

1. Health and health services
2. Law enforcement, public safety, first responder
3. Vulnerable population service provider (e.g., community outreach, childcare for essential service workers, substance use and addiction services)
4. Food and agriculture service provider (farming, food processing, grocery, hardware)
5. Transportation
6. Industry and manufacturing
7. Communications and information technology
8. Financial institutions
9. Other
10. Prefer not to answer

Mental Health Compared to before the COVID-19 pandemic and related restrictions in Canada, how would you say your mental health is **now**?

1. Significantly better now
2. Slightly better now
3. About the same
4. Slightly worse now
5. Significantly worse now
6. Prefer not to answer

COVID-19 Disease Which of the following applies to how you have been affected by COVID-19 at any point during the pandemic? (Please select all that apply)

1. I have been tested for COVID-19 and had a positive result
2. I have been tested for COVID-19 and had a negative result
3. Someone in my household has tested positive for COVID-19
4. Someone in my household has tested negative for COVID-19
5. A family member/loved one living at a different address has tested positive for COVID-19
6. I have self-isolated with symptoms of COVID-19
7. My household has self-isolated because someone else had symptoms of COVID-19
8. My household has self-isolated due to contact with someone else who had symptoms of COVID-19
9. My household has self-isolated due to recent travel
10. A family member/loved one living at a different address has self-isolated with symptoms of COVID-19
11. As part of my work I have worked directly with individuals who have tested positive for COVID-19
12. I have been hospitalized due to COVID-19
13. Someone in my household has been hospitalized due to COVID-19
14. A family member/loved one living at a different address has been hospitalized due to COVID-19
15. A family member/loved one is living at a long-term care facility that had cases of COVID-19
16. Someone in my household has died due to COVID-19
17. A family member/loved one living at a different address has died due to COVID-19
18. None of these
19. Don’t know
20. Prefer not to answer

Emotional Response Which of the following emotions have you felt as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Afraid
2. Panicked
3. Anxious or worried
4. Empathetic
5. Indifferent
6. Hopeful
7. Hopeless
8. Ashamed
9. Guilty
10. Lonely
11. Unprepared
12. Fearful
13. Sad
14. Grieving
15. Isolated
16. Angry
17. Stressed
18. Irritable
19. Bored
20. Inspired
21. Depressed
22. Uncertain
23. None of these
24. Don't know
25. Prefer not to answer

Stressors Have you been stressed or worried about any of the following as a result of the COVID-19 pandemic **in the past 2 weeks**? (Please select one option on each row)

1. Financial concerns (e.g. going into debt, ability to pay bills, long-term economic impacts, etc.)
2. Being unable to access benefit payments or not being eligible
3. Losing my job / loss of my job
4. Being able to cope with uncertainty (e.g. not knowing what will happen)
5. Becoming ill with the virus
6. Having no-one to care for me, as a result of becoming ill with the virus
7. Not being able to care for friends and family as a result of becoming ill
8. Not being able to care for friends and family due to physical distancing
9. Passing COVID-19 on to someone else if I became infected
10. Experiencing discrimination if I contract COVID-19
11. Being vulnerable because of an existing medical condition, age, etc.

12. Being separated from friends and family
13. Being able to cope with physical/social distancing (including concerns when needing to leave my residence for groceries, exercise, health care, etc.)
14. Having enough food to meet my household's basic needs
15. My education or career training has been or will be interrupted
16. Looking after my children while continuing to work
17. Making my existing mental health problems worse
18. Worrying about how the mental health of my child(ren) will be affected by the pandemic
19. Worrying about my children's education
20. Experiencing relationship challenges with my partner
21. Being safe from physical or emotional domestic violence
22. Fear of getting severely sick or dying
23. Fear of a family member/loved one getting severely sick or dying

1. Yes
2. No
3. Don't know
4. Not applicable
5. Prefer not to say

Food Security Since the onset of the COVID-19 pandemic and related restrictions in Canada, have you or any members of your household accessed food-based community programs to get food? (please select all that apply)

1. Food Bank
2. Soup Kitchens/Free Meal programs
3. Meal or food programs from a school
4. Community Kitchen program
5. Community Garden
6. Food voucher program (e.g., receiving gift cards for food from a charitable organization)
7. Food delivered by a community program
8. Other
9. No – I haven't accessed any food programs

Stress Overall, how well do you think you are coping with stress related to COVID-19 pandemic?

1. Very well
2. Fairly well
3. Not very well
4. Not well at all
5. Don't know
6. Prefer not to say
7. Not applicable – I have not experienced any stress related to COVID-19

Coping Which of the following have helped you to cope with stress related to the COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Connecting with those in my household
2. Connecting with my family or friends (e.g. phone, video chat, etc.)
3. Connecting with a mental health worker or counsellor **virtually** (e.g. via phone, video chat, etc.)
4. Having a supportive employer
5. Spending time with my pet(s)
6. Receiving **in-person** mental health supports
7. Accessing virtual mental health resources (e.g. online cognitive behavioural therapy, etc.)
8. Maintaining a healthy lifestyle (e.g. balanced diet, enough sleep, exercise, etc.)
9. Keeping up to date with relevant information (e.g. TV news, newspapers, online information, etc.)
10. Limiting my exposure to the news about COVID-19
11. Limiting exposure to social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
12. Increasing my use of social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
13. Contacting a support group (i.e., where members with the same issues can come together for sharing coping strategies, to feel more empowered and/or for a sense of community)
14. Going for a walk/exercise outside
15. Exercising in my home
16. Doing a hobby
17. Learning or doing something new
18. Volunteering to help
19. Accessing federal government benefits and supports (e.g., Canada Emergency Response Benefit, Canada Emergency Wage Subsidy, Canada Emergency Student Benefit, etc.)
20. Accessing provincial government supports (e.g., emergency benefits for workers)
21. Other [open] please specify _____
22. Don't know
23. Nothing has helped me to cope with my stress related to COVID-19
24. Not applicable – I don't feel stressed

Coping2 Please indicate how your use of any of the following has been impacted by the COVID-19 pandemic? (Please select one option on each row)

1. Consumption of alcohol
2. Use of tobacco products (e.g. cigarettes, cigars, chewing tobacco, vaping, etc.)
3. Use of cannabis products
4. Use of prescribed medication
5. Use of other psychoactive substances (e.g., cocaine, heroin)
6. Gambling
7. Eating too much
8. Eating too little
9. Screen time

1. More
2. Less
3. No change
4. Not applicable
5. Prefer not to say

The following questions are on the topic of self-harm and suicidal thoughts. We understand this can be a sensitive topic, so please remember that your answers are anonymous. If you are in crisis, please call 1-833-456-4566 toll free (In QC: 1-866-277-3553), 24/7 or visit www.crisisservicescanada.ca

Self-harm1 Have you done or experienced any of the following, as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select one option on each row)

1. Experienced suicidal thoughts/feelings
2. Deliberately hurt myself
3. Worried about someone close to me experiencing suicidal thoughts/feelings or deliberately hurting themselves

    1. Yes
    2. No
    3. Prefer not to say

    [if yes to above] Self-harm2 How often have you done each of the following as a result of the COVID-19 pandemic in the **past 2 weeks**? (Please select one option on each row)

    1. Experienced suicidal thoughts/feelings
    2. Deliberately hurt myself
    3. Worried about someone close to me experiencing suicidal thoughts/feelings or deliberately hurting themselves

        1. Once a day or more often
        2. Nearly everyday day
        3. A few times a week
        4. Passing thoughts
        5. Don't know
        6. Prefer not to say

Mental Health Support (Open-ended) If you could offer advice to others about how to support mental wellbeing during the COVID-19 pandemic, what would it be?

_____

Demographics

Gender identity Which gender do you most identify with?

1. Man
2. Woman
3. Transgender woman/trans woman
4. Transgender man/trans man
5. Non-binary
6. Two-Spirit
7. Not listed
8. Prefer not to answer

Ethnicity What is your family ethnicity? (Check all that apply)

1. Indigenous origins (for example, First Nations, Inuit, Métis)
2. East Asian origins (for example, Chinese, Japanese, Korean)
3. South Asian origins (for example, Indian, Punjabi, Pakistani)
4. Southeast Asian origins (for example, Filipino, Thai, Vietnamese)
5. Latin American origins (for example, Brazilian, Cuban, Bolivian)
6. European origins (for example, British, German, Russian)
7. Middle Eastern origins (for example, Iranian, Iraqi, Afghan)
8. African origins (for example, Nigerian, Ghanaian, Zimbabwean)
9. Other (please specify) _____
10. Don't know
11. Prefer not to answer

Sexuality Do you identify as being LGBT2Q+ (lesbian, gay, bisexual, trans, two-spirit, queer, etc.)?

1. Yes
2. No
3. Unsure
4. Prefer not to answer

Disability Do you identify as a person with a disability?

1. Yes
2. No
3. Prefer not to answer

Mental health Do you identify as a person who has a pre-existing (prior to COVID-19) mental health condition?

1. Yes
2. No
3. Prefer not to answer

Citizenship Which of the following best describes your Canadian citizenship status?

1. Canadian citizen by birth
2. Canadian citizen by naturalization
3. Landed immigrant/Permanent resident
4. Refugee
5. Not a citizen

Parent/Guardian status Which of the following best describes your parental/guardian status? (Please select all that apply)

1. Not a parent / guardian
2. Parent / guardian (any age)

    [If yes to parent/guardian] Children in household How many children (under 18 years of age) reside in your household?

        1. 0
        2. 1
        3. 2
        4. 3+

    [If yes to parent/guardian] Child's Age What age group is/are your child/children? (Please select all that apply)

        1. 4 years and under
        2. 5-11 years
        3. 12-17 years
        4. 18 years and over

[if yes to parent/guardian] Child Mental Health Compared to before the COVID-19 pandemic and related restrictions in Canada, how would you say the mental health of your child/children is now?

1. Significantly better now
2. Slightly better now
3. About the same
4. Slightly worse now
5. Significantly worse now
6. It is affecting my children differently (some feel better/some feel worse)
7. Prefer not to answer

[if yes to parent/guardian] Child Coping Strategies Which do you think have helped **your child(ren)** cope with stress related to COVID-19 pandemic in the **past 2 weeks**? (Please select all that apply)

1. Connecting with family who live outside our home (e.g. phone, video chat, text etc.)
2. Connecting with friends (e.g. phone, video chat, text etc.)
3. Contacting a **school or community-based** mental health worker or counsellor **virtually** (e.g. via phone, video chat, etc.)
4. Receiving **in-person** mental health supports
5. Staying in touch with teachers, school adults, childcare providers **virtually** (e.g. phone, video chat, text etc.)
6. Accessing virtual mental health resources through medical professionals (e.g. online cognitive behavioural therapy, etc.)
7. Accessing virtual educational or self-help mental health resources through websites, apps, or phone (e.g., Headspace, KidsHelpPhone)
8. Participating in a child/youth support group
9. Maintaining a healthy lifestyle (e.g. balanced diet, enough sleep, exercise, etc.)
10. Maintaining family routines (e.g., family meals, bedtime routines)
11. Keeping up to date with relevant information (e.g. TV news, newspapers, online information, etc.)
12. Limiting their exposure to the news about COVID-19
13. Limiting their exposure to social media (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
14. More time for social media use (e.g. Facebook, Instagram, Snapchat, Twitter etc.)
15. Going for a walk/exercise outside
16. Exercising in our home
17. Spending time with pet(s)
18. Playing outdoors

19. Playing inside (e.g., games, toys, telling stories)
20. Doing a hobby (e.g., music, reading, arts & crafts)
21. Volunteering to help
22. Other [open] please specify

_____

23. Don't know
24. Not applicable
25. Nothing has helped my child(ren) to cope with stress related to COVID-19

[if yes to parent/guardian] Parent-Child Interactions Please indicate how each of the following have been impacted by the COVID-19 pandemic. (Please select one option on each row)

1. Having quality time with my child(ren)
2. Feeling closeness with my child(ren)
3. Showing love or affection to my child(ren)
4. Observing resilience (strength and perseverance) in my child(ren)
5. Disciplining my child(ren)
6. Conflicts with my child(ren)
7. Using harsh words with my child(ren)
8. Yelling/shouting at my child(ren)
9. Spanking or hitting my child(ren)

1. More
2. Less
3. No change
4. Not applicable
5. Prefer not to say

Household living Which of the following best describes your living arrangements? (Please select all that apply)

1. I live alone
2. Living with a spouse or partner
3. Living with friend(s) or housemate(s)
4. Living with siblings
5. Living with my child(ren) who are over 18
6. Living with my child(ren) who are under 18
7. Living with other adult family members (e.g., parents, grandparents)
8. Living with grandchildren
9. Other
10. Prefer not to answer
11. None of the above

Age demographics Which age category do you belong to?

1. 18-24 years
2. 25-34 years
3. 35-44 years
4. 45-54 years
5. 55-64 years
6. 65-74 years
7. 75 +

Geographic region In which province or territory of Canada do you live?

1. Alberta
2. British Columbia
3. Manitoba
4. New Brunswick
5. Newfoundland and Labrador
6. Northwest Territories
7. Nova Scotia
8. Nunavut
9. Ontario
10. Prince Edward Island
11. Quebec
12. Saskatchewan
13. Yukon

Rural Urban Do you live in a rural or urban area?

1. Rural
2. Urban

Education Which of the following best describes your highest education level?

1. Less than high school completion
2. High school completion (or equivalent)
3. Some post-secondary education
4. Post-secondary certificate or diploma
5. Undergraduate degree
6. Graduate or professional degree
7. Other _____
8. Prefer not to answer

Marital Status Which of the following best describes your current marital status?

1. Single (never been married)
2. Married or in a domestic partnership
3. Divorced/Separated
4. Widowed
5. Other (please specify) _____
6. Prefer not to answer

Income Which of the following is the best estimate of your overall household income last year before taxes?

1. Under $20,000
2. $20,000 to $49,999
3. $50,000 to $74,999
4. $75,000 to $99,999
5. $100,000 to $149,999
6. $150,000 to $199,999
7. $200,000 or more
8. Prefer not to answer

Thank you for taking part in this survey. If you've been affected by this topic and would like any more information, need advice, or support, you can go to the following place for help:
Canadian Mental Health Association

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5 supplementary file
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	5
		(*c*) Explain how missing data were addressed	5
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5
		(b) Indicate number of participants with missing data for each variable of interest	NA

Outcome data	15*	Report numbers of outcome events or summary measures	5-7
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-7
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-9
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	9
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	9-10
Generalisability	21	Discuss the generalisability (external validity) of the study results	9-10
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.